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Windows-Based PBX That Saves Time & Money

3CX Phone System Can Help Any Business Improve Employee Mobility & Productivity

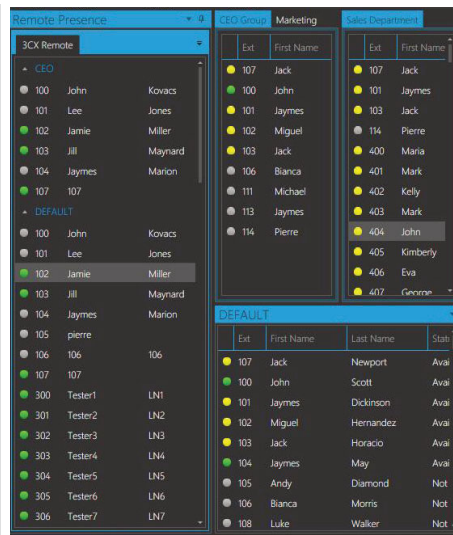
PBX CAN BE A REAL challenge. Setup and management are often complicated, most systems require buying hardware and software from the same vendor, and costs can skyrocket as you scale the system or add features and capabilities.

Solving those challenges and others is the key behind 3CX Phone System. "It's easy to deploy and use, scales well, and basically saves companies a lot of administration," says CEO Nick Galea.

No Training Required

Unlike many other PBX solutions, which are Linux-based or part of an appliance, 3CX Phone System is a software-based PBX for Windows. It easily plugs in to existing IT infrastructures utilizing existing servers, and most administrators can manage it with no training required. Simply install 3CX Phone System, and it automatically updates firmware and configures IP phones, SIP trunks, VoIP gateways, and 3CX softphones.

"3CX fits in perfectly with the existing IT infrastructure of most companies and can even be virtualized," Galea says, with support for Hyper-V or VMware.



3CX Phone System can provide at-a-glance presence information, so you know who is busy on the phone.

Because 3CX Phone System is based on the SIP open standard, you can choose from popular VoIP providers or hardware, including phones and gateways, so you get the best solution for your business.

Cost & Productivity Benefits

All businesses can benefit from 3CX Phone System, regardless of size or industry, Galea says. The ability to increase staff mobility and productivity is one of the key things customers like about 3CX Phone System, he says. Special

clients for smart-phones let employees use the phone system from anywhere and work seamlessly as if they were in the office.

Because it can integrate with other business apps such as Exchange and CRM systems, you'll benefit from other productivity features such as automatic retrieval of a customer name, one-click calling, and call journaling.

Presence features let you easily see whether colleagues are on the phone. Voice mails and faxes arrive via email, and you can easily launch conference calls from the desktop client.

All of these features are included right out of the box, which, when combined with other cost benefits, makes 3CX Phone System much more affordable than traditional PBXes, Galea says.

For example, not only is the system much more cost-effective to maintain, but it can also lower costs for IT administration,

mobile telephony, and cross-office phone calls. You buy your initial 3CX license based on how many simultaneous calls your company needs to make, and you can add extensions for no additional cost. Upgrades are free for the first year; after that, a yearly maintenance program includes any updates or service packs.

3CX Partners

3CX Phone System is available only through resellers or distributors who are part of a 3CX Partner Program. Different designations—Registered, Preferred, and Premium—indicate the experience and training partners have with the 3CX Phone System. 3CX Certified partners have passed a certified engineer and advanced certified test.

It's easy to become a partner, with no upfront payment or commitment required. Partners receive a free NFR license, training events, Webinars, and other support through 3CX. **P**

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Take The Load Off Your HVAC

ITWatchDogs Room Air Controller 10 Works To Boost Energy Efficiency By Improving Airflow Control & Monitoring In Small Spaces



DATA CENTER AIRFLOW and cooling are consistently ranked as a top concern among today's data center managers. And although you may have a small data center or network closet with just a few servers, switches, or a phone system, airflow can still be a big challenge.

The ITWatchDogs Room Air Controller 10 (RAC10) works in just such spaces, assisting with airflow issues that can easily overburden your air-conditioning system and take a bite out of your energy efficiency.

The ITWatchDogs RAC10 quite simply evacuates hot air

to your hot air plenum, where it belongs. It easily mounts above a rack or to the wall or ceiling, depending on the environment; an optional duct kit is available if needed.

The system has two temperature-regulated fans that adjust fan speed based on predetermined temperature settings. For example, you can set fan speed to increase as temperature increases.

When temperature falls outside of specified parameters, the RAC10 can trigger multiple escalating alarms via SNMP (v1, v2c, v3), email,

and SMS messages (email to SMS gateway).

In addition to the two included temperature sensors, the RAC10 can monitor 14 additional sensor inputs so you can add ITWatchDogs sensors for temperature, humidity, airflow, or other conditions for additional monitoring.

The RAC10 can log and graph information from any attached sensor and display that information in a Web browser—no software required. You can download the data as an XML or CSV file, with both real-time and historical graphs that can be scaled

and color-coded. The Web interface also makes it easy to create thresholds, set alarms, and update firmware. **P**

ITWatchDogs RAC10

- Two regulated fans and two temperature sensors adjust fan speed based on settings
- Logs and graphs data for all attached sensors and displays information via Web browser



ITWatchDogs

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All-In-One Cooling System

Expect Maximum Performance & High Efficiency From Dynatron's Enclosed, Internal 1U Server Liquid Cooler



LIQUID COOLING technologies are making an impact in the data center and one corporation is already ahead of the trend. As the demand for server cooling solutions among Web-scale and cloud operations evolves, Dynatron stands out as an ideal business partner that will meet the needs of organizations looking for a power-saving cooling option.

The Dynatron 1U Server Liquid Cooler is a self-contained liquid cooling system that requires no additive coolant. Its flexible design allows Dynatron to customize the

tube routing for its customers and exchange fans up to 40 x 40 x 56mm in dimension. You can expect reduced system noise thanks to the lower, power-efficient fan speed.

When it comes to setting up the compact 1U Server Liquid Cooler in your data center, it's simply a matter of completing a one-step, screw-on installation. Plus, the 1U Server Liquid Cooler supports customizable configurations for both 1U and 2U server applications.

In terms of CPU socket compatibility, Dynatron's cooler mounts on the fol-

lowing sockets: Intel LGA 2011, 1156/1155/1150, and 1366/1356, as well as AMD Socket AM3, AM2+, and AM2/FM1/FM2.

What's original about the 1U Server Liquid Cooler's form factor is that it features a copper radiator as opposed to the market standard alloy radiator—this difference results in improved heat transfer.

The high quality cooling characteristics of the 1U Server Liquid Cooler draw cool liquid from the heat exchanger and provide a consistent liquid flow to server

components in order to sustain efficient power consumption within a dense chassis. **P**

Dynatron 1U Server Liquid Cooler

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- Efficient cooling fins support high performance processors
- Quiet fan keeps noise at a minimum while saving power



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Flexible, Customized Views

DoubleSight Displays Multi Monitor Flex Stands Offer Height, Tilt, Pivot & Horizontal Movement, Holding Up To Nine Monitors On One Desktop



TODAY'S BUSY DESKTOPS hold a variety of computing equipment and, in many cases, multiple monitors. The DoubleSight Displays Multi Monitor Flex Stand fits well in such an environment, whether you're looking for simple ergonomic improvements or better organization.

Unlike other desktop stands, Multi Monitor Flex Stands feature a hinged design, says Dario DellaMaggiore, director of sales and marketing. "The flex design is similar to a human arm, hinged at the shoulder, elbow, and wrist." With as many as nine hinged points, the Flex Stands

ensure any user can customize the setup to fit their needs.

Flex Stands provide the same height, tilt, and pivot options as other stands but also offer horizontal, front-to-back movement up to 180 degrees. "You can actually swing one monitor around 180 degrees to face the person sitting across the desk from you," DellaMaggiore says.

The Flex Stands are available in single, dual, triple, and quad monitor models and fit most popular monitor styles and sizes up to 30 inches.

You can stack Flex Stands to accommodate two rows

of monitors, with options for additional height extensions and a notebook or tablet tray. Base options include a grommet and clamp to secure the stand in place, making the mounted monitors less likely to be stolen, damaged, or knocked off the desk.

Despite their extreme flexibility and customization options, the Flex Stands are easy to install. "We ship completely assembled, build with durable metals, and provide a lifetime warranty," DellaMaggiore says.

You can purchase the Flex Stands from DoubleSight

partners such as Staples, Office Depot, Tech Depot, PC Connection, Office Max, and Best Buy for Business. **P**

DoubleSight Displays Multi Monitor Flex Stand

- Flexible, hinged design offers extensive customization options
- All-steel construction
- Models ship fully assembled, ready for you to attach monitors



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Rear I/O



SYS-F627G2-F Series
4U, 4 Nodes
Front I/O



SYS-F627R3-F Series
4U, 4 Nodes
Front I/O



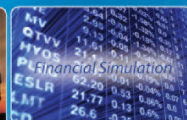
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4U, 4 Nodes
Front I/O



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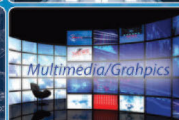
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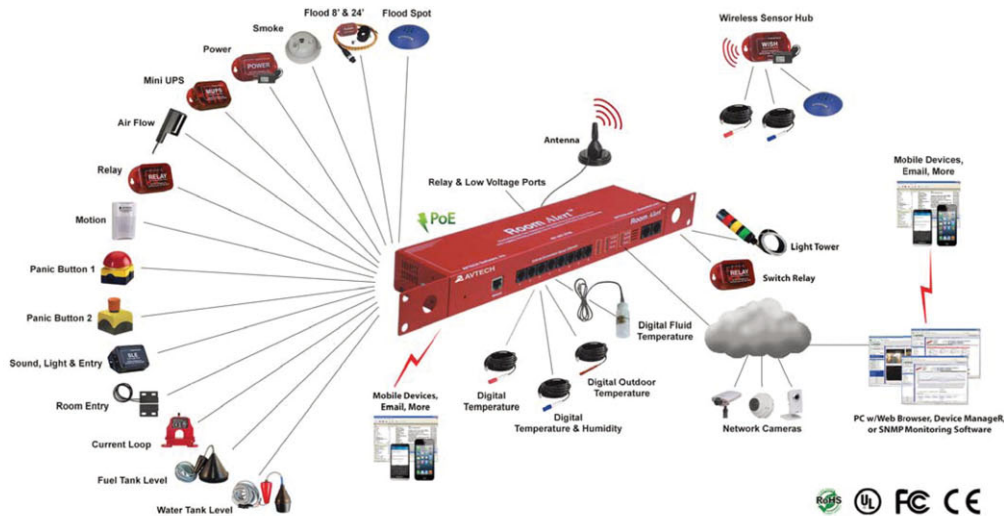
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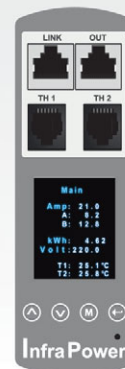
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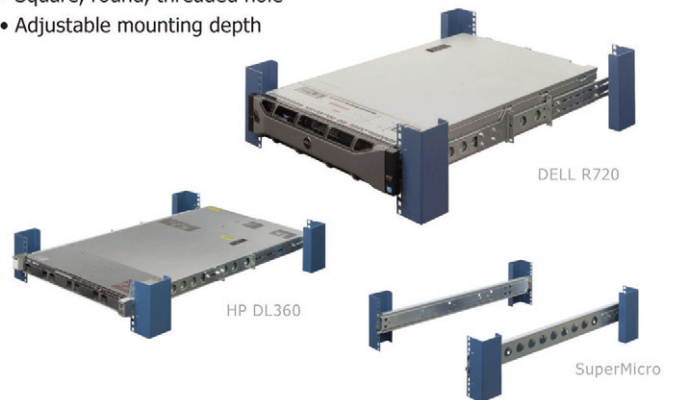
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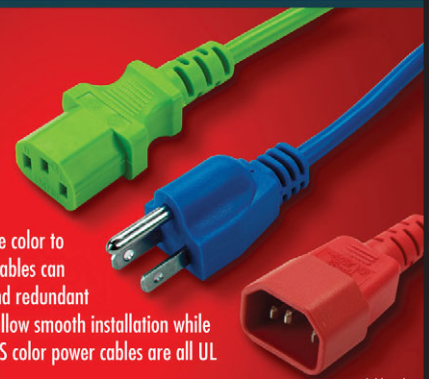
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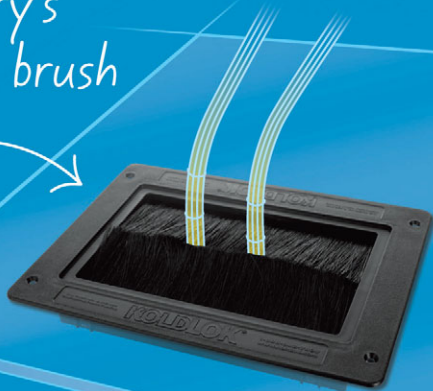
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■ The Internet Of Things Poses Numerous Challenges For Data Centers

By the year 2020, the IoT will consist of 26 billion installed units, connecting remote assets and real-time data streams together. Gartner says this volume of network connections and information will create new challenges for operations employees. "IoT deployments will generate large quantities of data that need to be processed and analyzed in real-time," according to Fabrizio Biscotti, research director at Gartner. "Processing large quantities of IoT data in real-time will increase as a proportion of workloads of data centers, leaving providers facing new security, capacity, and analytics challenges. The following summarizes seven significant IoT challenges outlined by Gartner:

SECURITY - With the ubiquitous proliferation of devices that comes with the IoT, various industries will experience security obstacles across the urban landscape.

ENTERPRISE - Businesses will have to navigate the security challenges related to deploying devices, supporting availability requirements, and managing big data.

CONSUMER PRIVACY - Data center managers should focus on securing the rapid accumulation of personal information on company devices.

DATA - Apps used by consumers will generate both big data and personal data, which will place more demand on storage capacity.

STORAGE MANAGEMENT - In addition to maximizing the utilization of storage capacity, companies need to determine whether "the business can harvest and use IoT data in a cost-effective manner."

SERVER TECHNOLOGIES - The marketplace should see a greater investment in key vertical industries and related organizations.

DATA CENTER NETWORK - Organizations should prepare for WAN connections to support increasing bandwidth requirements as a result of volumes of sensor data being processed.



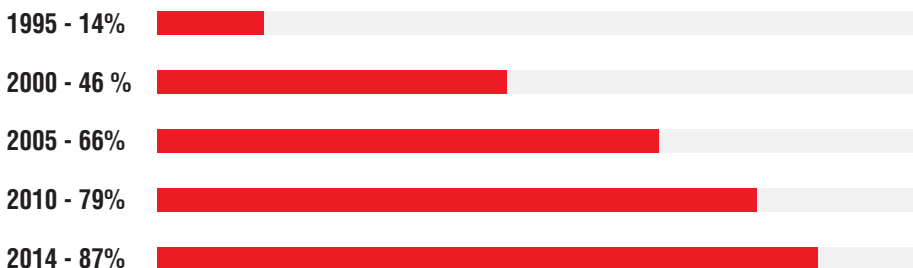
■ Despite Increased Sales, Small Business Outlook Pessimistic

The small business executives participating in Capital One's "Spark Business Barometer" 2013 fourth quarter survey reported better sales over the past six months: 40% reported increased sales (compared to 32% in 2012's fourth quarter) and 18% reported sales declines (compared to 20% in the fourth quarter of 2012). Still, less than half (46%) say they expect their company's financial situation will improve in the next six months. That marks an improvement over the 38% who expected better financial times in the 2012 fourth quarter, but pessimism generally remains. According to the recent report, 33% of respondents feel their company's financial situation has improved over the past year, 22% feel it has worsened, and 43% say it's about the same. When asked about the economic outlook for the coming year, only 46% were optimistic.

■ At 25 Years Old, The World Wide Web Is A Good Thing, Say Internet Users

Pew Research says the Internet has made an increasingly greater impact on numerous aspects of daily life, including "the way people get, share, and create news; the way they take care of their health; the way they perform their jobs; the way they learn," and more. Since 1995, the number of adult American Internet users has grown from 14% to 87%, with 68% of adults connecting to the Web on mobile devices. In general, 90% of Internet users believe the Internet has been a good thing personally; 76% say it's been good for society.

Internet Adoption Among American Adults, 1995 - 2014

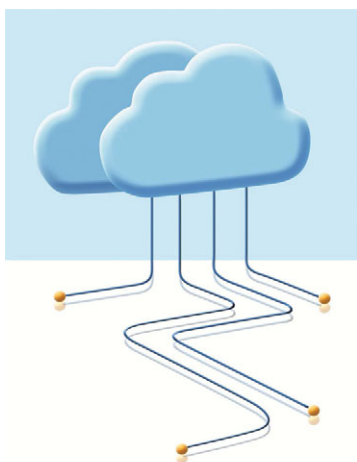


■ Threat Management Requires Trained Responders

Network security vendors offer appliances that are great for identifying incoming digital security threats, but trained personnel are required to deal with the threats after they are located. According to a Ponemon Institute survey of IT security practitioners in the United States and EMEA, additional personnel, better communication, and improved processes are needed to adequately address security threats after they occur. Although many organizations agree that threat identification is vital and purchase appliances for that purpose, relatively few follow through by providing IT with the needed resources.

■ Big Companies To Use Big Data Analytics For Security

By 2016, reports research firm Gartner, 25% of big global companies will have used a big data analytics solution to address at least one security or fraud detection case, compared to 8% currently. "Big data analytics enables enterprises to combine and correlate external and internal information to see a bigger picture of threats against their enterprises," says Avivah Litan, vice president and distinguished analyst with Gartner. "It is applicable in many security and fraud use cases such as detection of advanced threats, insider threats, and account takeover." According to Gartner, companies adopting big data analytics or security or fraud detection will enjoy a positive ROI within six months.



■ Gartner To Enterprises: Look To "Web-Scale IT"

Lessons learned from dominant cloud services will spread to other global enterprises in the coming years, according to Gartner. Less than 10% of global enterprises use a "Web-scale IT" approach (Gartner's term for all of the tech operations related to large cloud services) as of 2013, but Gartner asserts that by 2017 half of global enterprises will use the approach. "Their capabilities go beyond scale in terms of sheer size to also include scale as it pertains to speed and agility," says Cameron Haight, research vice president with Gartner, referring to big businesses. "If enterprises want to keep pace," he adds, "then they need to emulate the architectures, processes, and

practices of these exemplary cloud providers." Methods include identifying "every opportunity to reduce cost and waste," making facilities more energy efficient, and "in-house design of key hardware components such as servers, storage, and networks."

■ IDC Foresees Slowdown In Smartphone Market

Within the next three years, IDC expects growth in the worldwide smartphone market to slow, despite the fact that smartphone makers had a record-breaking 2013, with annual shipments surpassing 1 billion for the first time. "2014 will be an enormous transition year for the smartphone market," says Ryan Reith, program director with IDC's "Worldwide Quarterly Mobile Phone Tracker." "Not only will growth decline more than ever before, but the driving forces behind smartphone adoption are changing." Reith adds that new growth markets will focus on extremely low-cost phones, "and 'premium' will not be a major factor in the regions driving overall market growth." The research firm expects annual smartphone shipment growth to slow to 8.3% in 2017 and 6.2% in 2018.

■ PC Market Continues Decline

The worldwide PC market in 2013 declined at a rate of 9.8%, according to IDC, slightly better than the research firm's projected 10.1% rate of decline. The desktop PC market appears to be heading into a somewhat steeper decline as emerging markets, which had been viewed as continued buyers of desktop PCs, are increasingly opting for portable computers. IDC expects worldwide desktop PC shipments will fall from an estimated 129.1 million this year to 119.2 million in 2018, and tablet computer shipments will rise from 166.8 million in 2014 to 172.5 million in 2018.

■ CFOs Optimistic About 2014 Hiring

Based on new data from BDO USA, 91% of tech CFOs anticipate that the number of their company employees will remain consistent or increase in the next year. Moreover, surveyed

CFOs say they expect employee salaries to stay the same or increase this year. Among the tech areas that should receive greater focus are big data, cloud computing, and data security. Other key areas that will see employment growth in 2014 are sales, marketing, manufacturing, and R&D. These jobs should remain onshore, too, as most CFOs (95%) don't plan to outsource operations in upcoming years. Atfab Jamil, partner and leader of the Technology and Life Sciences practice at BDO USA, says, "hiring wars will continue, and companies will need to compete for the strongest, most innovative talent in the domestic and global markets" as demand for the latest technology continues.



■ 4G LTE To Reach 2 Billion By 2019

As of 2013, there were 230 million 4G Long Term Evolution-related (LTE) subscriptions worldwide, according to ABI Research. In a recent announcement, the research firm projects that there will be more than 2 billion LTE-related subscriptions by 2019, representing a 43.6% CAGR (compound annual growth rate) between 2013 and 2019. "The large population base in Asia, combined with rapid LTE network deployment and cost-competitive smartphones, has accelerated the remarkable subscriber adoption," says Marina Lu, research associate with ABI Research. North America, however, has what ABI Research calls the "most aggressive" market for LTE Advanced, which supports more bandwidth than does standard LTE.

Implement Physical Security Measures In Your Data Center

Know The Risks & What You're Protecting To Pinpoint The Best Options & Strategies

IT'S AN UNFORTUNATE FACT that most data centers today weren't designed with security in mind. They're rooms inside an existing building. Areas right next to employees in an open office. Separate buildings placed inside a larger office park.

It's not often that a data center manager gets the chance to build a new data center with physical security in mind. So if you have that opportunity, or have a need to establish some physical security measures for your data center, where do you begin?

Identify The Problems

"Many existing data centers were built with security as an afterthought or as buildings that were later repurposed as data centers," says Jeff Pike, director of technology at Global Information Assurance Certification (GIAC).

Richard H. Ficarek, CSO of the SANS Institute, says that

such facilities may be missing any of the following: redundant power feeds all the way to the computer, redundant or N+1 cooling, multiple network providers, redundant network to computer systems, redundant or N+1 UPSes, and redundant or N+1 generators with large-capacity protected fuel storage.

On the surface, some of those measures may seem a bit extreme—and indeed could be for some data centers. John Burke, CIO and principal research analyst at Nemertes Research, says that, unless you are trying to pass a specific audit, there is no objective definition of physical security needs for data centers.

"There is no end to the security improvements possible with an unlimited budget," he says. "No security budget is unlimited. So it comes down to corporate risk calculations." Physical security, he says, is another layer of



insurance on operational integrity, data privacy, and legal compliance. "How much that is worth to the company should control how much IT spends on securing the data center."

Plenty Of Options

"Physical security is what we do to protect against unauthorized physical access to servers, whether intended to compromise them, remove them, or vandalize them, and to protect them from physical damage resulting from accident or natural disaster," Burke says.

That means "keeping people from pushing in USB keys where they oughtn't, keeping servers and disks in racks where they belong, and keeping folks from dumping a bucket of sewage to protest corporate policies they don't like," he says, while also protecting data centers from disasters such as floods, fires, and electrical surges and outages.

When it comes to actual data center physical security procedures, Ficarek says common

options include buried utilities (water, network, voice, and power); concrete perimeters and building walls/foundations; limited entry points, including windows; extensive smoke, fire, and water detection and suppression; security cameras; 24/7 security guards; badged and escorted visitors; proximity badge/access cards and biometrics; man-traps and piggyback detection; and locking server cabinets and cages.

Key Points

- Countless physical security options exist, ranging from low-cost padlocks to high-end crash-proof barriers.
- A risk assessment can help you pinpoint the likelihood and potential impact of physical or data loss.
- Every data center, regardless of size or location, needs at least some physical security protections in place.

Get Started

To best identify which physical security measures you need, start with a risk assessment of your facility that takes into account the value of the data stored and running through your data center. "Physical risks to the facility, personnel, and data should be evaluated based upon the old-fashioned formula of potential impact multiplied by the likelihood of occurrence," says Jeff Pike, director of technology at Global Information Assurance Certification (GIAC). Once you've done that, you can identify and evaluate the best countermeasures to mitigate the greatest risks.

As security requirements increase, he says, so do the options, including: open-field buffer zones with crash-proof barriers; security gate controlled access to parking lots with retractable barriers; bomb searches of entering vehicles; the ability to secure or seal air-handling with contaminant detection; bulletproof glass; armed security guards; X-ray machines; metal detectors; laser tripwire fences; and even FAA-controlled no-fly zones.

Burke says the classic approach to protecting data centers from people involves the three G's: gates, guards, and guns. "This can be too expensive and lacks depth," he says, which is where a layered approach combining access security on the facility with multiple layers of multifactor access control, air-lock-style man-traps, and security cameras, can help.

"It's not enough that folks can't enter an enclosure; they also have to be unable to reach the servers through any gaps or openings," Burke says. "Keeping a person out is good; making sure they can't poke a broomstick through to start tapping server power buttons is even better."

How Much Is Too Much?

Armed with the knowledge that every data center today needs at least some physical security measures, how do you know which strategy is best?

"There are two ways something might be considered over-kill: if it unreasonably interferes with legitimate access, and if it is unsustainably expensive compared to the risks mitigated," Burke says.

"Most physical security measures at most slightly delay an admin getting physical access to a server," he says. "If a measure is dramatically increasing that delay, it should be re-evaluated on a cost/benefit basis: How much incremental security does it add vs. how much does it cost in lost productivity?"

Pike adds another consideration: "You don't want to pay more to secure information than it's worth," he says. "No matter what we do, there will always be vulnerabilities that can't be completely mitigated." ¹

Action Plan

Build employee awareness. "Security awareness of personnel is sometimes overlooked in a physical security assessment, but employee behavior is often the weakest link," says Jeff Pike, director of technology at Global Information Assurance Certification. "Companies can achieve more bang for the buck with security awareness than any other security technology."

Factor in security. Pike says security needs to be factored into everything about the data center design, including site location, building specification, and power and HVAC requirements.

Regularly review policies. Derek Brink, vice president and research fellow at Aberdeen Group, says most companies have physical access control systems with policies for who has access. Periodically review these policies to prevent inappropriate accumulations of access privileges as roles change, "orphan" access privileges that remain after someone has changed roles or left the company, and so on.

Top Tips

All data centers need physical security. The only data centers that don't need physical security measures are ones where the data center "neither contains valuable assets nor does valuable work, which is to say, nowhere in today's enterprise," says John Burke, CIO and principal research analyst at Nemertes Research. "Remember, physical security includes really fundamental things like having a lock on the data center door, fire suppression, surge protection, and proper drainage."

Consider a penetration test. Richard H. Fifarek, CSO of the SANS Institute, says a regular third-party physical penetration test can help you validate and fine-tune security policies and procedures.

Account for regulations. HIPAA, PCI DSS, NERC CIP, ISA99, SAS 70, and SSAE16 are among potential industry regulations experts say have specific physical security standards and steps to follow. Burke says some regulations have specific minimum requirements, while others simply require "adequate physical security controls" but do not go into specifics.

Make Sure Your Enterprise Can Survive A Cloud Failure

What You Can Do To Prepare For & React When A Cloud Provider's Service Goes Down

EVENTUALLY, ALL CLOUD providers will experience a failure. That's why no cloud provider guarantees 100% uptime and why it's vitally important enterprises using a provider prepare for that day. This includes calculating the costs the enterprises can suffer in terms of revenue, hits to reputation, and more. The following details strategies and advice for identifying the risks of using a cloud provider and putting the enterprise in a position to appropriately deal with failures.

Prepare Well

Providers experience failures or even suddenly go out of business, which is why you must have a comprehensive business continuity and disaster recovery plan in place beforehand. This is true no matter your enterprise's size, says Amy Larsen DeCarlo, Current

Analysis principal analyst. "Key data needs to be continuously backed up, and the company needs to have contingency plans in place that include some built-in redundancies, automatic failover, and a backup cloud provider," she says.

Small to midsized enterprises (SMEs) are particularly vulnerable because the cloud providers that cater to their needs "don't always offer the same levels of protection that larger suppliers provide," DeCarlo says. Further, these providers aren't always as financially stable as larger counterparts, she says.

John Howie, chief operating officer at Cloud Security Alliance, says that many cloud service providers offer services with "less interruption and far smaller time to restore service" than the average SME. Still, SMEs must plan for service interruptions with the strategies



used varying depending on the service, he says.

Typically, IaaS providers are "very clear that their service is subject to failure and offer service-specific guidance for consumers," he says. Usually, that guidance includes provisioning multiple instances of service in different zones, areas, or regions so if one fails, the other continues uninterrupted.

Guidance with PaaS providers, meanwhile, is usually service-specific and varies greatly among providers due to services being implemented in various ways (unlike IaaS), Howie says.

Where SaaS is concerned, enterprises have little control over availability beyond "perhaps specifying where they'd like service to fail over to," Howie says. If a provider ceases service altogether, SMEs must know how they'll move applications and data from one provider to another. "Regular (at least annual) tests of this are a must," he says. SMEs must also prepare for outages by having

Key Points

- Implement a thorough business continuity and disaster recovery plan.
- When a failure occurs, inform all affected parties and turn to manual systems you've prepared ahead of time.
- A cloud providers' services are generally highly reliable and experience less interruption and time to restore than many enterprises do.

manual systems and local replicas of data such as orders and customer lists prepared they can use if the outage is prolonged.

Know How To React

When a failure does occur, Howie says the first step is communicating the failure to all affected parties, including employees, partners, contractors, and customers. Next, implement manual systems you've prepared ahead of time

Get Started

To effectively deal with a cloud provider's service failure, have internal backup and redundancy plans in place and a secondary provider lined up. Additionally, have a real understanding of the service being used and spend time building a cloud solution that meets your needs, including uptime requirements. Press the cloud provider for information regarding how it architects services to eliminate single points of failure and what redundancies are built in. Also ask for guarantees around recovery times, not just availability, and be conscious of how an even relatively high-availability guarantee may still allow for considerable downtime on a monthly basis.

and then monitor the provider's situation and plan to move systems and processes back to the cloud once problems are fixed. "SMEs will need to be aware of potential lost data and the need to integrate data, such as orders and updates, collected through the manual systems during the outage," Howie says.

DeCarlo advises having a secondary provider in line so that the company can resume operations. "Key information should be backed up and recoverable in a short time frame," she says.

Rachel Dines, senior analyst at Forrester Research, says it's important to know what services the enterprise will and won't receive from the cloud provider to clear up confusion and assumptions about who is responsible for what.

"It's best to assume, when working with a public cloud provider, that the additional services they'll deliver are minimal. Also, even within a single cloud provider, there are different and often confusing policies around resiliency," she says. For example, the same provider may have different resiliency policies for its different service types.

Calculate The Risks

A key aspect of preparing for a failure is realistically calculating what it's likely to cost the business. Quantifying a financial number can be difficult or even impossible, DeCarlo says,

because a failure can mean not only immediate lost business but damage to the company's reputation. "Depending upon the nature of the business, organizations may also be subject to regulatory penalties or there could be legal implications of unplanned downtime," she says.

Howie advises SMEs use exactly the same approach and formula to calculate cloud failure costs that's used to calculate failures involving on-premises IT solutions. The greatest risk of depending on cloud providers is "the general frustration and uncertainty that comes with shifting responsibility for various aspects of IT operations, including service availability, to cloud providers," he says.

During an outage, management and staff must realize they have far less control over the situation than they'd like, and "knowing when service will be restored will be difficult to ascertain," he says.

Howie emphasizes that the likelihood a cloud service will fail is far less than with traditional on-premises solutions. "When used correctly, IaaS can be extremely reliable, especially where multiple providers are used, and most PaaS and SaaS services commercially available are far beyond the average 99.9% availability marketed," he says. "It's far more likely a telecommunications failure will render a service unavailable than the service itself go down." ¹²

Action Plan

From a resiliency perspective, Forrester Research Senior Analyst Rachel Dines suggests the following to vet a cloud provider's disaster recovery capabilities:

- Audit backup/disaster recovery plans and review planning documents
- Know where recovery centers are geographically located
- Know what happens to data if a failure occurs at one site
- Determine if data is moved outside the country/region
- Know the service levels guaranteed during a disaster
- Ask for expected/guaranteed RTO and RPO times
- Know how data is backed up, where, and how often
- Know the protocol used to restore data from backups
- Know the retention policy regarding backups
- Determine the resiliency of the provider's data center facility such as Tier III or IV equivalent or SSAE 16 compliant.

Top Tips

Cloud uptime. Cloud providers are generally better at running their systems and maintaining service availability than small to midsized enterprises, says John Howie, Cloud Security Alliance COO.

Adapt. Beyond having a contingency plan, be "prepared to adapt and adapt quickly," says Current Analysis Principal Analyst Amy Larsen DeCarlo.

Double up. Consider using a cloud-to-cloud continuity service that can automatically route traffic from one cloud center to another, whether within the same provider's network or to another provider.

Server Technologies & Trends On The Horizon

Virtualization, Cloud Computing, Optimization & Efficiency Will Drive Future Innovation

SERVERS CONTINUE to improve in terms of both performance and efficiency as data centers focus more on virtualization and energy cost savings.

But it's difficult to get a clear picture of where this innovation will go in the future without understanding what features and trends are driving these performance and efficiency gains. The past few years have introduced quite a few new changes to the server world, and there's no reason to expect this momentum to stall. Here are a few new technologies and trends to be aware of this year and beyond.

A Three-Way Split

Andrew Butler, research vice president and distinguished

analyst at Gartner, says that there will be new technologies galore in the next two to three years, including "integrated systems and fabrics, appliances, cloud infrastructure, extreme low-energy servers, and hyperscale workloads."

Although these technologies will surely bring about greater innovation, Butler says they also will create "even greater disruption" in the marketplace. This disruption will lead to challenges for vendors and users alike as companies try to determine which user category they fall into.

The first group, Butler says, are "risk-averse Type C users" who are likely to stick with traditional infrastructure



dominated by well-known brands. The second group consists of "users of disruptive technology where known vendors attack new adjacent markets," he says. For instance, this could be a primarily network-based or telecommunications-based company deciding to move into the blade server market.

The third group consists of "users willing to take the greatest risks to achieve competitive advantage," which will open up opportunities for "emerging vendors with more radical approaches," Butler says. As vendors release new servers, buyers will need to decide which category their company falls into and exactly how risk-averse they are toward emerging technologies.

Multinode Servers & Increased Density

Multinode server technology has been growing in

popularity recently, to the tune of 13,000% over the past four years, Butler says.

Multinode servers help with consolidation and optimization by allowing you to fit more servers into the same chassis. For instance, a 2U chassis could support four servers and up to 64 processor cores using multinode technology.

"Multinode servers are taking over workloads that were once a stronghold for blades," Butler says. He expects that 17% of the x86 market will be hyperscale by 2015. He also adds that the "new interest in an ELE [extreme low energy] server market will stimulate new multinode design concepts" and that "multinode and ELE are opening potential for ODM vendors and new market entrants."

Big Data & The Cloud

According to IDC, spending on big data technologies

There Is Still No Silver Bullet

"Few organizations will meet all their needs with one single form factor or operating system choice," says Andrew Butler, research vice president and distinguished analyst at Gartner. That's why you need to profile the capacity needs of workloads to assess different form factors, he says. For instance, Butler says you should "consider blades when maximum performance per watt or performance per square meter is key," but "consider multinode servers when maximum horizontal scaling at lowest cost is required."

He also adds that, because of the growth of virtualization, companies should include storage and networking vendor preferences in the decision-making process. It takes a mix of solutions to get the best performance, so you need to ensure all of your preferred vendors' products properly integrate with each other.

and services will grow by 30% this year, and there will be a race to develop data-optimized cloud platforms capable of leveraging high volumes of data and/or real-time data streams.

Because the number of cloud-dedicated data centers continues to grow, IDC reports, the market for server, storage, and networking components will increasingly be driven by cloud service providers, who have traditionally favored highly componentized and commoditized designs.

The combination of these factors means that many cloud vendors, including the market leaders, will begin developing servers specifically designed for cloud computing use cases, IDC researchers say.


Virtualization & Optimization At The Forefront

With virtualization growing in popularity and expected to continue its rise this year and beyond, companies have to be focused on optimization and utilization more than ever before. And although every new server will no doubt provide better performance and be more efficient than past models, it doesn't mean you can simply buy a cookie-cutter unit and assume it will fit your unique business requirements. It's up to companies to navigate through all of the available features and work with a vendor to find the right mix of new technologies for their present and future needs.

"Today, it is simply not enough to select and order a server from a product

catalog," according to Supermicro (408/503-8000; www.supermicro.com).

"To operate at peak performance and efficiency, servers must also be optimized to the buyer's application and business needs," according to Supermicro. "Server systems must have the most optimized

components, and they must be deployed into end-to-end solutions that are themselves tuned to the application for which they were designed. Servers must also have the proper software management, support, and installation services required to keep them operating at peak performance and efficiency." 

Know When To Upgrade

"The latest servers must provide a clear advantage in terms of key operating and financial parameters, such as performance, efficiency, bandwidth, throughput, storage, networking, CAPEX, and OPEX," according to Supermicro (408/503-8000; www.supermicro.com). For that reason, it may not be in your best interest to upgrade right away, but rather to wait until available technologies align with your overall business goals. "The best time to upgrade servers is when a strong business case can be made for the change," Supermicro says. "Whether it's an upgrade, consolidation, or leading-edge deployment," your vendor should have a program to "help buyers make the right decisions."

BONUS TIPS:

Newer Components Will Go Mainstream

Supermicro (408/503-8000; www.supermicro.com) says many new technologies that have been developed in recent years will become mainstream this year. "These include but are not limited to VDI, DDR4 memory, PCI-SSD storage, SAS 3.0 I/O, and x86 enhancements."

Supermicro adds that these technologies will help integrate the ideas of green computing, connectivity, content, and the cloud, which the company refers to as the "four C's." Rather than a server aiming to satisfy one or two of these areas, Supermicro states 2014 will see vendors coming up with new products that will "consolidate the four C's into integrated solution offerings."

Integrated Systems & Their Impact On ROI

"An integrated system is only as good as its ability to integrate with the rest of the infrastructure," says Andrew Butler, research vice president and distinguished analyst at Gartner. "Users should validate that integrated systems fit the enterprise, IT organization, and other infrastructure before implementing." He

adds that integrated systems increase the technology dependency on a single vendor strategy and capability. When making the decision to buy an integrated system, you need to calculate ROI based on CAPEX, OPEX, and soft benefits, Butler says. "The more disruptive a new server solution is, the more it needs to generate substantial ROI," he says.

Properly Maintain Data Center Flooring

Raised Flooring Needs To Be Cleaned Both Above & Below The Surface

HARDWARE DOESN'T FAIL without a reason. The cause might be poor craftsmanship or engineering, or perhaps it was an unforeseen force such as a flood causing water damage.

Many failures, however, simply have to do with shortcomings in cleaning the data center, including the raised flooring. If you don't clean flooring correctly or often enough, it could lead to expensive equipment giving out prematurely. Properly cleaning raised flooring, however, means knowing what and what not to do and what impact having a clean environment can have on the data center's general health.

Go Below The Surface

Cleaning isn't generally anyone's idea of a good time. But it's imperative the task is performed well and consistently. With raised flooring, this

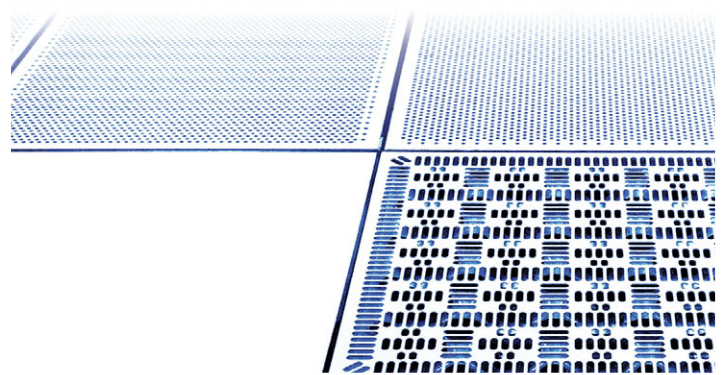
means cleaning both above and below the floor's surface.

In most cases, the area under data center flooring is also the data center's air plenum, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Neglect this area, and contaminants will mix with sensitive computer equipment leading to overheating and shortened life cycles. Underfloor contaminants also circulate throughout the data center, meaning you'll require more CRAC/CRAH maintenance to maintain cooling capacity.

Know The Routine

Ultimately, the point of cleaning data center flooring is to extend the life of the data center and avoid overheating issues, downtime, and money loss.

Cleaning floors properly above and below, Koty says, not only produces energy



efficiencies and aesthetic value but also improves uptime. One key to reaching this state is having a preventive maintenance schedule.

When it comes to a basic schedule, Koty recommends cleaning flooring and equipment surfaces at least quarterly and cleaning the sub-floor plenum at least yearly. Change air-handler filters every three months or more frequently when a data center comes online or if you suspect the environment is especially dirty. "A newly constructed or recently renovated data center environment will be especially dirty and will require more frequent cleaning," he says.

Koty recommends vacuuming before mopping. Never use a dry mop; it can push dirt into perforated tile cracks and openings and reduce airflow, thus "starving important cool air from key electrical equipment," he says.

When using power scrubbing equipment, plug it into

Key Points

- Neglecting to clean under flooring can result in equipment overheating and shortening life spans.
- To clean data center flooring, use specific tools and chemicals/cleaners.
- A professional cleaning service can make sense, but the vendor should be certified and show it complies with industry standards.

maintenance outlets only, Koty says. Using only low-speed scrubbers will reduce the chance of creating airborne particles or bumping scrubbers into racks and cabinets.

Additionally, Koty says to remember that all cleaning chemicals must be approved for a data center environment.

Do's & Don'ts

Enterprises should start the raised-floor cleaning process

Get Started

When cleaning data center flooring, make certain mops and wiping cloths are made of low-lint material and designed specifically for clean-area environments, says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Only use mops to clean data center areas, he says; don't use mops previously used outside the computer room. Use proper cleaners and a good vacuum with either an Ultra Low Particulate Air (ULPA) or High Efficiency Particulate Air (HEPA) filter system. Only use these vacuums for data center cleaning.

by doing what's possible to eliminate contaminants from entering the data center in the first place. Koty says it can help to use sticky mats at all entrances and have a staging area to unpack materials before entering clean areas.

Keep doors closed at all times; limit access to necessary and authorized personnel; use contamination control mats at all entrances, particularly antistatic mats that dissipate static electricity; don't allow food or drink in the data center; don't unpack or assemble items in the data center; don't store paper, cardboard, or similar supplies that may shed and collect contaminants; perform work outside the data center; ensure any tools and equipment that do enter are clean; and replace any floor tiles showing excessive wear.

Before cleaning floors, wipe the tops of racks and cabinets and work down to the floor, Koty says. "It doesn't make a lot of sense to clean the raised floor then have someone come the next day and dust down the server racks knocking dirt back onto the floor." When cleaning perforated tiles, use a vacuum with a good HEPA filter, and any cleaning attachments and tools used should be non-conductive.


In addition to using a good vacuum with a HEPA filter to clean raised flooring, Koty advises cleaning all perforated

tiles at least once a year. Koty has found through experience that removing and cleaning perforated tiles outside the raised floor area with a pressure washer does a great job of removing embedded dirt. Dry the tiles in a clean, sunny place and have spare tiles to replace the dirty ones you're removing so you don't interrupt the airflow design.

Consider Help

If properly trained, internal staff should be able to clean flooring, Koty says, but staff should have proper supervision. If hiring a professional cleaner, the Association of Data Center Cleaning Professionals requires that all certified data center cleaning vendors demonstrate their cleaning processes comply with accepted data center cleaning standards.

Certified vendors also must meet certain insurance requirements, Koty says. "If you decide to use an outside

vendor, ask for references and be sure to call them and inquire if there any issues with the vendor," he says. 

Action Plan

Establish a routine. Create and follow a regular maintenance schedule for cleaning data center flooring.

Train. Properly train personnel to clean under flooring, including ensuring that they know the importance of power and communication cables to overall enterprise operations.

Look high. Before cleaning the actual flooring, wipe the tops of servers and cabinets and then work down to the flooring level.

Weekly. Perform basic floor cleaning tasks such as dry vacuuming.

Quarterly. Perform more extensive cleaning (damp cleaning) of raised flooring.

Annually. Clean under flooring at least once a year.

Top Tips

Look for black dust. When cleaning under flooring, check for black rubber dust in front of AC units, which can signal a misaligned blower belt. Other than spreading dust, a misaligned belt can indicate more problems are likely to happen if the belt isn't realigned or replaced.

Use the right stuff. Using incorrect chemicals for cleaning flooring will typically result in damaging the surface's material. Using the wrong tools, such as brooms and mops, meanwhile, can hinder cooling and airflow efforts.

Hire a pro. Hiring a professional cleaner has advantages, including the pro's ability to establish an appropriate cleaning schedule and select the right cleansers and equipment. A professional cleaning service might also offer consulting services.

Diagnose Network & App Performance Issues

Monitor Every Facet Of Your Data Center To Zero In On Specific Problems

EFFORTS TO DIAGNOSE and solve network and application performance problems can be tedious, especially if they don't occur on a consistent basis. And if you wait until your end users speak up, it might be too late to fix the issue before impacting productivity and uptime. The key is to think ahead and be wary of key indicators. If you put preventive strategies and technologies in place beforehand, the troubleshooting process will be less stressful and time-consuming

Establish A Process

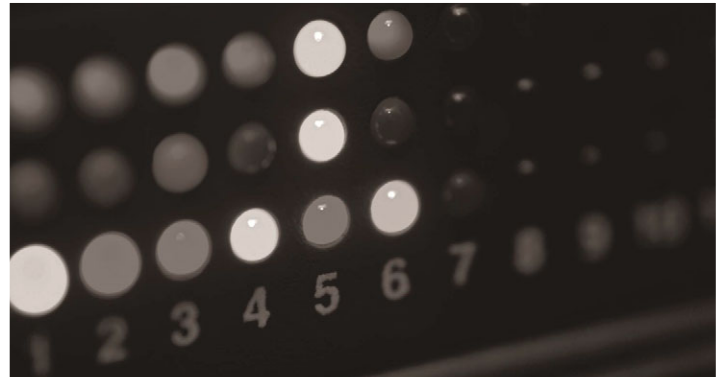
When it comes to performance issues at any level of your data center, the worst thing you can do is react to problems as they occur. Although this is sometimes inevitable, it doesn't have to be the general rule.

For example, Jean-Pierre Garbani, vice president and principal analyst at Forrester,

says companies shouldn't "deploy an application if they have not put the necessary monitors in place to make sure it will function properly and that the IT operations group is effectively able to not only detect but solve any types of problems that might occur."

Monitoring is only the first step. You also need to designate roles for your employees and put steps in place to address problems and solve them in a timely manner.

"Establish an incident and problem management process by which the different levels of management are defined," Garbani says. "Who gets alerted? What do they do? To whom do they forward the problem? How is it corrected? Establish a process and then, for each step of the process, understand what tools are needed. They don't need to have a broad vision of



the infrastructure; they just need to understand their own space. You need to think about how you organize it and what tools you provide to each level."

Know Key Indicators

When you're trying to diagnose specific application or networking issues, time will be one of your best indicators. "From the network, you have the possibility to understand when a transaction comes in and when the answer goes out," Garbani says. "Therefore, time to process is usually the right way to pinpoint whether there's a problem."

You can run diagnostic tests by sending packets throughout your network, into applications, and wherever else you think necessary. By measuring how much time it takes for that information to transfer, you should be able to determine where your latency or processing issues are originating.

But in addition to time, Garbani also stresses the

importance of network, compute, and storage capacity.

For instance, with a network, it could be something as simple as "someone watching a basketball game on the LAN and sucking all the bandwidth," he says. On the server and compute side, an employee could unexpectedly spin up too many virtual servers and eat up resources. And when it comes to storage, Garbani says that it can come down to how a database is configured physically on disk. If application performance issues are the symptoms, then capacity could be one of the root causes.

Consider A Comprehensive Management System

Mark Tauschek, principal consulting analyst at Info-Tech Research Group, says although it's important to monitor the end-user experience and listen to feedback, "by the time you hear it from them, it's too late to be proactive." This means that once

Overall Visibility Is Crucial

It's crucial to get a big-picture view of your infrastructure in order to avoid finger pointing, according to Mark Tauschek, principal consulting analyst at Info-Tech Research Group. If your networking, application, and server teams are all separate, there may be an alarm somewhere in the data center, but each individual monitoring solution will claim that everything is OK in that specific department. "There are several pieces, like application delivery controller or a WAN, which add to the complexity," Tauschek says. "The key really is to get comprehensive visibility into network, server, and applications."

you hear that an application isn't performing correctly or the network connection is slow, "you're already into troubleshooting mode and trying to reactively resolve the situation," he says.

A better approach, Tauschek says, is to use a comprehensive systems management solution or a network management system (NMS) that will provide visibility into your systems.

"A good NMS or systems management solution is going to allow you to drill down and find the root cause much more quickly," Tauschek says. "You're going to be notified of it proactively, depending on how you set thresholds for alarms, before users start calling you."

Troubleshoot The Layers

When going through the troubleshooting process, start at the

bottom layer and then work your way up. This approach makes it possible to rule out certain issues and ensures that when you do find a problem, it is more than likely the right culprit.

"You start at layer one, which is physical," Tauschek says. "Make sure that you actually have connectivity whether it's on a wire or with RF being the physical medium. You can use a spectrum analyzer, a port analyzer, or a cable tester."

From there, you get into the second layer where you can look at the network and specific connections. Eventually, you'll get to layers four through seven, which all have to do with "flows and applications," Tauschek says.

"It's really a process of moving up the stack and by the time you're up to layer seven, you're

really into the granular application level of troubleshooting." At this layer, you're looking at the potential for bad code, a bug in an application, database backend

issues, and more. But before you get to the application level, you have to make sure your physical infrastructure and networking components work correctly. **P**

Don't Assume Application Limitations Are Normal

Jean-Pierre Garbani, vice president and principal analyst at Forrester, says that too often "there are things people don't look at because they take it as part of the normal working of an application." He says that "from the get-go, there may be something wrong with the software or with the way the application or server is configured."

For example, Garbani remembers when he was producing software for car dealers and found that the maximum number of workstations the software could support on a server was 15, which caused the company to lose bids. Then, "one day we found that this limitation was a software issue, and once it was corrected, we could increase the number of workstations," Garbani says. "Sometimes what we consider normal is abnormal."

BONUS TIPS:

Broad Before Purpose-Built

Mark Tauschek, principal consulting analyst at Info-Tech Research Group, says that companies will get more value if they opt for a "broader systems management solution" instead of trying to monitor performance with individual solutions. He says that "purpose-built solutions tend to be more expensive" and

"you don't get as much traction or mileage out of them." Tauschek also says that while larger organizations can "more likely justify the costs of purpose-built solutions," this may not be the case for smaller businesses. And if for some reason you can't seem to nail down an issue with a comprehensive solution, he recommends you simply rent a tool or call somebody in to help you troubleshoot.

Utilize Historical Data

Whether you're trying to pinpoint performance problems or make sure that your fixes are actually making a difference, you first need to establish an historical baseline. It's always helpful to know what's currently going on with your network or applications, but if you don't have a baseline figure to compare it to, you'll have no way of knowing whether your optimization

efforts are effective. "You can look at incidents like the lack of bandwidth or lack of resources, which may be temporary," says Jean-Pierre Garbani, vice president and principal analyst at Forrester. "It would be helpful if you had some level of analytics that's using the data, something that historically shows you, on this day of the year, the normal traffic on your network and the normal flow of information in and out of a given application."

Trends In Tape Storage

All The Reasons You Shouldn't Overlook This Cost-Effective Archiving Solution

WHEN YOU THINK of innovation, you probably think of the latest technology that would benefit your data center. What may not come to mind, however, is how older technologies can evolve to become relevant all over again. Such is the case with tape storage.

Now and into the coming years, tape storage will look much more like a hybrid solution than ever before. So if you've been listening to naysayers crying "tape is dead," an appropriate response would be "tape is evolving." Read on to learn more about what this evolution and growth will look within today's storage infrastructures.

A Tale Of Two Tape Stories

Depending on whom you ask, tape is either making a resurgence or it's being

crowded out by other more "modern" storage mediums.

"In terms of the overall marketplace, you can tell two stories. One of growth and relevance and one of decline and irrelevance. People have been firing away at the tape market aggressively for 10 to 20 years to make it irrelevant," says Robert Amatruda, research director for data protection and recovery at IDC.

Amatruda says tape is still significant in terms of data protection as well as disaster recovery, and it's increasingly making an impact in the archiving market. What makes it relevant is that "it's still a relatively low-cost medium when you compare it against data being stored on disk drives, general-purpose disks, and backup appliances."

Tape Is The Tortoise In The Storage Race

Tape storage may not carry with it the pomp and circumstance that some of the latest storage solutions do, but "tape deserves a look if you're managing terabytes and petabytes, [whereas] disk and appliances can actually be more expensive," says Robert Amatruda, IDC's research director for data protection and recovery.

Although tape is a slow-moving market, Amatruda says it's still a relevant marketplace in the new IT infrastructure. And from an innovation standpoint, "there are active development road maps by multiple vendors around drives and automation."



He adds that customers are using disk-based strategies such as snapshots, replicas, and mirroring; however, tape is "really a story about consolidated infrastructure where you've got, for a lack of a better word 'bigger tape' behind the applications."

Tape Technologies

When you incorporate tape backups into your overall storage plan, keep in mind that you're not simply saying yes to one approach that may not even be ideal for your storage strategy. Thomas Coughlin, president and founder of Coughlin Associates, says there are a number of approaches for backing up to tape.

"Caching to disk drive arrays and then to tape is one approach," Coughlin says. "In addition, because mounted and running tapes have very high data rates, there are some caching systems for tape backup that are using flash

memory to keep up with the tape data rates."

Although linear tape open (LTO) has been standardized as an open-format technology to enable ubiquity between the array of existing tape options, linear tape file system (LTFS) format has seen greater adoption in the past year.

"The use of LTFS file systems in modern tape storage makes tape storage like a file system storage (the tape shows up like an external disk drive)," Coughlin says. With LTFS, he says, data centers can, in essence, treat tape like another file storage format.

Coughlin adds that there's also a new movement to create what's called representational state transfer (RESTful) object-based tape storage, in which tape can be written from the application through the RESTful API interface that "may work well in a cloud-based archive environment."

Tape Capacity Advantages

In terms of long-term information storage, Coughlin says magnetic tape is a cost-effective media. “[Magnetic tape] doesn’t use power when not being used, and the digital tape formats being used today can last for decades under the right storage conditions,” he says.

Modern digital magnetic tape uses technology developed several years ago for hard disk drives, he says. Keep in mind, however, that “magnetic tape has slower access time than HDDs, but it costs less for storing the same amount of content.”

The lesson to learn here is that there’s a lot of available technology to continue to increase tape capacities, because “tapes can provide volumetrically efficient content storage and low storage operating costs for cold storage applications for many years to come,” Coughlin says. In fact, he says tape capacity increases greater than 30TB are on the horizon.

“This notion of having a tape drive associated with a server or rack has really been shattered in favor of a large tape system that can manage hundreds of terabytes and now petabytes of storage,” Amatruda says. “From that standpoint, tape is still very, very relevant.”

Where Tape Is Taking Us

Although tape storage has been around for more than 50 years, Amatruda says the takeaway is that there’s innovation going on with tape in the marketplace.

“It’s still a marketplace that has longevity—it’s amidst a transition. So that’s what we’re seeing in terms of the decline in the revenues,” he says. “There’s been some consolidation in the marketplace [and] it’s really a reflection of a changing use case for tape oriented more along the lines of archive.”

In this era of big data, or what Amatruda calls “the capture period of data,” a lot of companies and governments are collecting data but won’t be performing analytics on

the data right away, he says. Instead, they need a place to archive it that is both cost-effective and reliable. “Most of the data being captured is

unstructured—images, surveillance, and video camera capture. Tape is really very appropriate for the new world order,” he says. **P**

The Myriad Advantages Of LTFS

According to Robert Amatruda, research director for data protection and recovery at IDC, a linear tape file system, or LTFS, is essentially putting a file system on the tape itself. “It strips the tape of all of its proprietary formatting and makes the drive accessible much like a USB drive,” he says. “You don’t have to load the cartridges or get through the application software to actually do recovery.”

Amatruda says that LTFS frees the user from the entire process, and this is potentially a game-changer, so much so that it’s penetrating non-traditional industries. “We’re seeing it being used in areas where tape hasn’t had a role traditionally, such as media, entertainment, broadcast—it’s really prevalent there.”

BONUS TIPS:

Examine Your Objectives

Whether you find it prudent to combine tape storage with alternative solutions, such as disk storage, is contingent upon your company’s recovery point and recovery time objectives, says Robert Amatruda, research director for data protection and recovery at IDC. “If the recovery time objective is very short, you tend to see

disks oriented behind that. If it’s measured in days [and] months, tape is really oriented behind that,” Amatruda says. Increasingly, he says that customers are relying on both strategies, though there is a trend to move away from tape for operational recovery.

Success Is In Longevity

The continued success of tape lies more in its persistence

within the storage marketplace rather than its appearance in headline-making tech news. “The rub is that there are numerous success stories, but you only hear about the failures when people lose their data in a grand style,” Amatruda says. “At the end of the day, you’d be hearing more griping about tape-based recovery if it didn’t work well. It’s kind of a catch-22.”

Standards & Regulations Impacting Data Centers

Some New Changes Could Force You To Upgrade Your Software Or Hardware

SOME STANDARDS and regulations maintain the status quo and are relatively easy to follow, but there are a few common ones that change frequently and could impact your data center. When it comes to compliance, it's important to stay ahead of the curve to make sure your data is secure and that your infrastructure is capable of supporting the newest standards and regulations.

Sarbanes-Oxley

The Sarbanes-Oxley (Sarbox) Act hasn't changed much since its introduction in 2002. The act targets publicly traded companies and is meant to make them better track and report on their financials. But according to Darin Stahl, principal consulting analyst at Info-Tech Research

Group, Sarbox can also be helpful for companies that aren't publicly traded and even non-profits. "There are a lot of folks that want to understand what's happening in a non-profit," he says. "Where are my donations going?" Almost any enterprise can benefit from following Sarbox principles to make sure important financial information is available if and when it's needed.

Perhaps the biggest change to Sarbox came in 2013 when the Committee of Sponsoring Organizations (COSO) made some adjustments to its framework to help companies translate technical IT information into real risks that they can understand and manage. It's all about adding more visibility to the process



and helping companies get a better grasp on what they could be doing better. With this change comes a bit of confusion, and Stahl says it's important that when external or internal auditors come in and check on your Sarbox compliance, you understand beforehand whether those auditors are working with the 2002 or 2013 framework.

PCI DSS

The Payment Card Industry Data Security Standard (PCI DSS) should be familiar to any business that handles credit card numbers. Whereas there have been few changes to Sarbox, PCI DSS is much more fluid and has a 36-month life cycle laid out in eight stages. Within these cycles, there could be multiple versions of the same standard that regulated companies must comply with.

Stahl says that, because of the dynamic nature of PCI, "it's really critical for IT groups to understand and back this into their life

cycle plans." Once PCI moves from one version to another, you can "no longer operate under the older versions," he says.

PCI DSS is having a major impact on companies, and more specifically data centers, in regards to the use of legacy systems. Stahl says that PCI DSS doesn't necessarily come out and say that a specific piece of legacy, end-of-life software is no longer compliant, but it forces you to perform penetration tests and meet certain requirements that simply aren't attainable by some older software. This approach essentially requires you to upgrade those systems in order to be PCI-compliant because it would simply be too difficult to bring it up to standard.

It's important to stay ahead of the game with PCI, because you don't want to end up having to make massive infrastructure changes because you're using software that's a decade old.

Know What Regulations Apply

There are so many regulations and standards that it can be difficult to determine which ones apply and which ones you can ignore. Darin Stahl, principal consulting analyst at Info-Tech Research Group, says it is important to get out in front of this issue. "You'd be surprised how many folks don't understand until something happens that, 'Wow, I really was supposed to comply with this.'"

Stahl says companies should take an enterprise risk management approach to compliance and, instead of just focusing on risk mitigation, security, disaster recovery, and resiliency, also consider other risks at the enterprise level that could eventually "move up into IT." Tracing these risks should help you better understand the business processes in the organization and what types of regulations apply to your operations.

HIPAA & HITECH

The HIPAA and HITECH acts are targeted at companies in the healthcare industry. Whereas HIPAA primarily deals with the organizational and business sides of the issue, HITECH focuses on the IT side of things and actually enforcing HIPAA laws.

Stahl says HIPAA and HITECH laws are similar to PCI in that companies have been encouraged to upgrade older systems in order to meet compliance in the past but are now being forced to do so. He says there will be another update coming in 2016, but that the primary focus right now is on pulling older systems into the future and determining exactly how these changes will affect the industry.

Renee Murphy, senior analyst at Forrester Research, adds that the Office for Civil Rights (OCR), which audits companies to make sure they comply with HIPAA, has claimed for 10 years that it's "too busy and doesn't have the resources, so you're going to self-assess."

But now, the OCR is starting to perform audits. "Now, they're saying 'we're going to show up, you have 10 days, and here are the 30 things we're going to look at,'" she says. "What's interesting about that is that no one was ready, and they're probably still not. If you self-assess for 10 years and you think you're

taking reasonable assurances and you find out later that it wasn't reasonable at all, you have a lot to catch up on."


FedRAMP & The Cloud

For companies in the cloud computing industry or those that utilize the cloud, regulatory compliance issues are common. Although many cloud providers claim to support certain regulations, Murphy stresses that not all of these are truly beneficial.

One regulation, FedRAMP, which was created by the federal government using NIST guidelines on cloud computing as a framework, is having a major impact on the cloud with its more than 300 controls and 1,200 assessment points. It also takes "six months to ramp up to it and another couple months just to get through the audit," Murphy says, so it's

not only good for ensuring protection for federal data, but also for corporations that want a little extra protection.

"What makes this interesting is that, although I might not be a federal customer, maybe

I'm a corporate customer that would like the security that the federal customer gets now," she says. "That's the great thing about FedRAMP. They publish everybody that has that compliancy." 

SAS 70 & SSAE 16

In addition to Sarbanes-Oxley, which only applies to publicly traded companies, there are also standards for non-publicly traded companies that do business with publicly traded ones. Renee Murphy, senior analyst at Forrester Research, says that the standard used to be SAS 70, which had some controls in place to allow them to work with people who had to be Sarbox-compliant, but now that standard has been updated to SSAE 16, which is broken into SOC 1, for financial institutions, and SOC 2, for "everybody else, including cloud providers, data center providers, SaaS people, and professional services." The biggest change with SSAE 16 SOC 2 is that the standard is much more privacy and security focused than SAS 70 and applies to those non-publicly traded companies that interact with Sarbox-regulated businesses.

BONUS TIPS:

Be Aware Of Jurisdictions

Darin Stahl, principal consulting analyst at Info-Tech Research Group, says companies should be aware of issues related to jurisdictions. For instance, a regulation in California might require more reporting than the same regulation in a different state or country. Different jurisdictions may go beyond security and

require regulated companies to do a certain amount of business with "disadvantaged companies," Stahl says. "You have to pay attention to those."

Cloud Contracts

Renee Murphy, senior analyst at Forrester Research, says a major problem with cloud contracts is that they "still look like colocation contracts." They deal with issues such as availability

and bandwidth, but they don't talk about what regulations they comply with and what will happen with your data after the contract is dissolved. This is a problem for regulated companies and should become a part of cloud contracts in the future. "What they need to talk about is the level of security, redundancy, disaster recovery and business continuity, and data retention," she says.

Find & Eliminate Ghost Servers

Track Down & Address Unused & Underutilized Data Center Servers

EVEN A CURSORY investigation into data center “ghost” servers (those that are underutilized or unused) unveils some disconcerting information. For example, an estimated 15% of data center servers qualify for ghost status.

One estimate based on a server consuming 400W of power and costing about \$800 per year suggests companies spend more than \$24 billion annually on such servers. Obviously, finding ghost servers is important for these reasons and others.

Ghosts In The Data Center

According to an EnergyStar.gov article, one survey conducted indicates eight to 10% of older servers not in use are still running. One study specifically found 150 of 1,800 servers as “comatose,” while another found 354 of 3,500 servers in the same state. EnergyStar quotes an Uptime

Institute official as saying data centers without a rigorous program to address obsolete servers likely could be in a position where 15 to 30% of data center equipment is comatose.

Just as alarming is a study from The Green Grid, an IT efficiency consortium, that found about 33% of IT managers have never attempted to identify unused servers.

Mark Bowker, Enterprise Strategy Group senior analyst, says ghost servers are still a real problem, though one that organizations that have significantly invested in virtualization have picked up on. Ghost servers are “probably one of the first targets for being virtualized,” he says.

Basic management tools hypervisor providers offer enable IT managers to obtain reports concerning underutilized servers and thus identify those showing no usage over, say, several weeks in order



to start asking questions and come up with a plan to deal with them, he says.

Bowker says companies with multiple branch offices geographically distributed are more likely to have ghost servers. “I can absolutely imagine where IT doesn’t have the best visibility and best perspective at what’s in those branch offices,” he says. Another possible scenario involves mergers or acquisitions where servers “just don’t get captured,” Bowker says.

Overall, it’s a rare IT organization that feels it has captured 100% of its environment, Bowker says.

The Heart Of The Matter

Ghost servers exhaust energy, capacity, and cooling, among other things. Greg Schulz, senior advisory analyst at Server and StorageIO, says KVM and other networking connections and software licenses being consumed, yet not effectively being used are also downsides. The

Key Points

- Ghost servers consume numerous resources despite possibly returning no business value.
- DCIM and other management tools can help identify ghost servers.
- Cloud computing is creating ghost servers as companies spin up servers in public cloud services but don’t turn them off after a project is completed.

latter equates to missed opportunity, he says.

Ghost servers occur for several reasons, including leases coming to an end, depleted IT staff lacking time/resources to track them, and a fear of violating SLAs if the servers are decommissioned. Schulz says unless you’re explicitly looking for such servers or have software or good inventory to identify what’s present, “it’s probably not until there’s some pain point or action needed to

Get Started

According to Greg Schulz, senior advisory analyst at Server and StorageIO, DCIM and storage resource tools are becoming good at performing analysis, assessment, and discovery tasks concerning server utilization. He says virtualization software vendors and their partners also have tools. Schulz adds that if an enterprise has an older application running on a server but needs the application for some business function, it’s “a good candidate for virtualization where it can be powered up, powered down, and effectively archived for when it’s needed.”

free up power, cooling, rack or floor space, software licenses, or something else that will drive you to find and address them.”

An enterprise may not decommission underutilized servers for capacity reasons. Mukul Krishna, Frost & Sullivan global director of digital media, says while a desire to create operational efficiencies exists, from a business standpoint it’s important to “remember a data center is a tool. The overall objective is growth for the company.” Thus, you need to consider opportunity costs in terms of keeping excess capacity.

Today, opportunity is tied to data, he says, which is critical to business, “all about extracting intelligence,” and rapidly expanding. Especially for larger companies, an ability to make real-time decisions basically trumps much else, Krishna says.

Strategies For Success

To address ghost servers, Schulz says first gain insight “into what you have, how it’s being used and by whom, and the systems or applications meeting their service requirements and customer expectations.”


Next, devise a plan to consolidate where possible, he says, so that aggregation doesn’t cause aggravation. Some servers may have to be consolidated at a lower level vs. others to meet quality of service or performance needs. Schulz adds that storage resource

management and DCIM tools are getting good at doing analysis, assessments, and discovery.

Bowker says the cloud is the next wave where ghost servers could become problematic. If an enterprise consumes public cloud capacity but doesn’t turn off its servers after a project’s completion, it’s “still going to be billed for that, whether they’re being used or not,” he says.

Management tools, however, are getting really good to call this out, he adds. “It’s up to IT at that point to take action, and that action is likely asking, ‘Who owns that server? What’s it doing? Do we have to archive it somewhere? Can we spin it down and turn it up when we need to?’,” Bowker says.

Krishna says knowing where to draw the line is key. “Optimal is not being at capacity,” he says. “Optimal is always having some elbow room so that if I know the data needs will suddenly go crazy, I have enough capacity it’s going to keep me running until I can provision for more service.”

By constantly tracking data center trends, running analytics, using dashboards, deciphering trends from spikes, and more, companies can better position themselves. Algorithms, for example, can send up red flags concerning capacity requirements and limitations and enable establishing thresholds to help detect anomalies vs. long-term trends to provision for, he says. 

Action Plan

The Green Grid, a non-profit dedicated to improving data center efficiency, advises that sustaining even a small percentage of unused servers is an expensive problem to ignore. To that end, the organization recommends:

Obtain support. Get management support regarding the TCO message related to unused servers.

Take note. Inventory all systems and servers, identifying types, location, and SLAs.

Establish baselines. Identify and assess secondary and tertiary work common across servers in order to establish baseline utilization and discover unused servers.

Identify the servers. Use DCIM tools to identify unused servers.

Stay in place. After turning off unused servers, keep them in place for 90 days in case complaints are lodged.

Create guidelines. Establish clear guidelines for what to do with decommissioned servers such as recycle or repurpose.

Top Tips

Understand. Determine where ghost servers exist; what they’re being used for; what they could be used for; and if they’re candidates for virtualizing, replacement, and the like.

Track. Look beyond server CPU and disk space utilization to memory, IOs, and application-response time information, plus user complaints about performance and hits to productivity.

Be consistent. Identifying top virtual machines sitting idle should be a weekly or monthly task. Next, determine what the server does and what applications are on it.

Improve Your Malware Protection

Strike A Balance Between Traditional & Newer, More Advanced Technologies

ALMOST EVERY COMPANY understands the real threat of malware and has some form of security in place, whether it's a firewall, antivirus software, or something more advanced. But as attackers get more sophisticated, companies need to determine whether their existing approach is good enough to protect them from the newest threats.

It's important to get a solid mix of traditional, foundational security solutions and newer, more advanced technologies to cover all your bases and fully protect your internal assets.

Evaluate Your Existing System

In recent years, malware has gone from simple programs "that signature-based

approaches could take care of to being more sophisticated and targeted," says James McCloskey, senior consulting analyst at Info-Tech Research Group. Although your current anti-malware deployment may have been able to handle threats well in the past, it may not be up to the task anymore.

McCloskey says that companies need to understand their expectations upfront while evaluating their current anti-malware approaches and then determine if they need a new solution to properly deflect targeted attacks.

Igor Frankovic, director of attack simulation and exploitation at Offensive Security, says that more and more companies



are investing into security training for their employees but that "the knowledge gap between attackers and defenders is, for the most part, still considerable."

He recommends that companies find either open-source or commercial tools with smaller learning curves that "can help identify common and known vulnerabilities, therefore enabling systems and network administrators to better protect their assets." However, these solutions "will most certainly not provide a comprehensive security assessment" on their own, he says, but they should help you develop a rough idea of your current state.

Know Traditional Anti-malware Limitations

"Traditional signature-based detection is still important, and there is a lot of malware out there today that can be caught using signature-based detection," McCloskey says,

but because malware evolves at such a fast rate, vendors are struggling to keep up.

Even emerging technologies from the past decade, such as whitelisting, are limited. Although whitelisting gives companies solid control over what types of software and executable code is allowed to run on a given machine, it also "creates problems for situations other than ones where you have a locked-down kiosk-type of computer that is only meant to do one thing," McCloskey says. In more general computing cases, whitelisting can "severely hamper the ability for a user to get work done," he says.

Frankovic says traditional solutions aren't enough and says that "we still see many companies relying too much on antivirus solutions and network firewalls as their main perimeter defenses." He adds that "while they certainly play their role, a comprehensive security solution will contain many other

Don't Test Anti-Malware On Your Own

Companies that try to use real malware programs to test their own anti-malware solutions are playing with fire, because the "danger of potentially having that malware get loose in your environment greatly exceeds the risk of something getting through the front door," says James McCloskey, senior consulting analyst at Info-Tech Research Group.

Instead, he recommends visiting the Web sites of testing organizations that analyze different anti-malware products and provide information on their catch rates and other indicators of success. These independent testing groups can help you wade through the buzzwords and supposed product features to tell you if a solution will actually work in your environment. This removes the need for potentially risky self-testing while still giving you peace of mind.

technologies and approaches, such as Web application firewalls, properly implemented separation of user privileges, strict network segmentation, well-designed egress network traffic filtering, timely patch management, and so on.”

Most companies can’t get by on the bare minimum anymore and should start looking at more advanced solutions.

Consider New Approaches

Behavioral monitoring and sandboxing are two modern techniques that companies are now using. “It’s the idea that unknown software can be put into a safe sandbox environment where it can be executed and where the antivirus solution can inspect it for certain behaviors,” McCloskey says.

You can separate a potentially malicious program from the rest of your network and search for strange behaviors such as “hooking into memory, turning systems on and off, renaming files, and other things that you wouldn’t necessarily see using a signature-based detection model.”

Sandboxing can also help you better implement whitelisting because, according to McCloskey, you can choose to “whitelist everything that you know is good today and allow any software that passes through your sandbox successfully to also be added to the whitelist.”

This makes the process much more dynamic and gives you the locked-down environment you need while still leaving it “flexible enough for multiple users to get work done,” he says.

Behavioral monitoring provides a more in-depth look at file scanning because it goes beyond the present and involves the history and reputation of files across the anti-malware vendor’s global intelligence network.

Know The Needs & Abilities Of Your Company

Your security needs depend on the size of your company and the type of data you store. More advanced solutions require “dedicated staff for proper implementation and operation, and a sizable financial investment,” Frankovic says. Large

organizations may be able to afford these costs, but smaller ones that can’t still need to understand that they aren’t too small to be targets anymore.

“Most companies should consider themselves to be a target and analyze how much they

need and can afford to invest into protecting their assets and reputation,” Frankovic says. “Some companies are already well protected and require more knowledge and dedication to breach and others present lower barriers.” ¹²

Seek Expert Help & Don’t Limit Testing Efforts

If you’d rather have some hands-on testing done to your specific anti-malware implementation, Igor Frankovic, director of attack simulation and exploitation at Offensive Security, says you should enlist the services of “an experienced and unbiased third-party provider to perform regular security assessments.” But if you go with a third-party testing organization, make sure you let it be thorough in its testing. “Companies should not impose unreasonable and artificial scope limitations on the security consultants conducting the testing,” Frankovic says. “Sometimes even the smallest mistake on a system, which appears unimportant and unnecessary for testing, can have a drastic impact on the security posture of a network.”

BONUS TIPS:

Cloud Component

James McCloskey, senior consulting analyst at Info-Tech Research Group, recommends that companies look for solutions that have a cloud component offered through the anti-malware vendor. “What we’re seeing a lot more of now is the ability for files that don’t pass a reputation check, because there isn’t a known signature,

to get sent out automatically to a cloud service to be inspected on the fly in their sandbox environment,” he says. This not only protects your business, but also helps the vendor improve its products.

Carefully Consider Updates

“Sometimes it is hard to justify the financial resources needed for upgrades and updates when the benefits are

marginal at best,” says Igor Frankovic, director of attack simulation and exploitation at Offensive Security. “Although it is always nice to have the latest and greatest tools, people responsible for the well-being of a network should take some time to review the benefits that are offered with new versions of security products and analyze if the financial resources required can truly be justified.”

Use The Cloud To Help Your Data Center

Some Newer Ideas For Projects & Tasks That Could Benefit From The Cloud

FOR MOST COMPANIES, it simply isn't possible to move every application, business process, or dataset to the cloud. There are a number of possible reasons for this, including regulatory compliance issues, public cloud security concerns, or a reduced latency requirement for running certain applications.

But just because a few of your applications aren't a fit doesn't mean that you can't take advantage of the cloud. In fact, almost any data center can take advantage of the flexibility, scalability, and simplicity of the cloud. And many already have.

Mobility & Big Data

Many companies are struggling to keep up with the needs of an increasingly mobile workforce. As more and more

mobile devices require access to data and internal resources, data centers may need to beef up their infrastructure in order to keep up with demand.

But where traditional infrastructure is "scale out," the cloud is "scale up," says John Sloan, principal consulting analyst at Info-Tech Research Group. That means you can gain access to more resources as you need them rather than needing to add additional physical infrastructure to overcome issues. You have the option of creating personal clouds for employees or mobile cloud applications, which opens up new opportunities for mobile data access.

Big data is another major issue that's currently facing data centers, and the cloud could prove helpful. Companies are dealing with "very large, heterogeneous



datasets that are coming from a variety of sources," Sloan says. And while you may store much of that data onsite, it's difficult to analyze without some outside help. That's why Sloan says the cloud is a great resource, because you can scale up your resources during a particularly large data analysis project and then scale them back down after you're done.

These mobility and big data concerns can go hand-in-hand, Sloan says. "If you launch a mobile app that integrates back into the company, you will likely need a very elastic Web backend or portal on it, which functions better in the cloud than on typical converged systems," he says.

"If the app is successful and you have thousands or millions of people using your app, then there could be opportunities to gather real-time data from all of those people. That's the kind of big data analytics problem that cloud services are better at solving," he says.

Key Points

- Use the cloud's scalability to support application backend and data portals and for big data analytics.
- Add resources as needed for temporary application testing and development projects.
- Reduce infrastructure customization in order to take advantage of the latest and greatest technology.

Get Started

If you're in the early stages of cloud exploration and are looking for ways to best utilize it, you need to consider which applications are a fit and which ones aren't.

"One of the first things they have to do is triage their applications and put them into buckets," says Rich Fichera, vice president and principal analyst at Forrester. He says applications that are already implemented as virtual machines may be a good fit, but those built on legacy architecture are not. It's important to involve your "user community" as well, because users can help you see the value of moving certain apps to the cloud, Fichera says.

Application Testing & Development

The scaling capabilities of the cloud can prove ideal for business purposes other than big data analytics.

For instance, Rich Fichera, vice president and principal analyst at Forrester, says that test and development "is a common entry point" for many data centers and that the test and development team inside

your company is often “the most volatile in its use of certain systems.” In fact, Fichera says that test and development was one of the early beachheads for virtual machines in general and that the cloud can serve those teams in much the same way.

App development often requires access to a large amount of computing resources, and if you build out permanent infrastructure to meet those needs, you could end up with equipment you’ll never use again or at least won’t use frequently enough to justify the cost.

With the cloud, you can simply request additional resources during development or if you need to test an application on a larger scale. You only pay for the resources you use, and you don’t have to worry about physical infrastructure collecting dust inside your data center.

Standardize Systems

Ed Anderson, research director at Gartner, says that some organizations have gone so deep into customizing their infrastructures and applications that it can make it difficult to take advantage of new technology as it’s released. For that reason, some companies are actively trying to standardize their systems in an effort to “leverage the best the industry has to offer,” he says.

The cloud can aid in that standardization process simply because most cloud environments are less complex and more standardized in general.

“One way to think about this is the shift from a current environment that is 80% customized and 20% standardized to a new cloud-based operating model which will be 20% customized and 80% standardized,” Anderson says.

“The switch drives a much more efficient operating model where the organization can take the best from the broader industry and then really focus on the differentiated value exposed through the 20% of their environment that is customized. The key here is that cloud computing acts as a catalyst for making this change.” **P**

Action Plan

Ed Anderson, research director at Gartner, offers the following steps for cloud development:

Educate yourself. Understand all available cloud computing models as well as the marketplace of providers offering public cloud services.

Consider data and apps. Determine which applications and datasets are a fit for the public cloud and which ones make sense to keep in-house in a private cloud. Know that not all workloads and processes are suited for the cloud.

Assess your IT team. Figure out whether your team is capable of managing an internal or external cloud environment and seek provider help if necessary.

Introduce cloud services methodically. Don’t simply opt for every available service. Pick the ones that make sense and implement them in waves.

Top Tips

John Sloan, principal consulting analyst at Info-Tech Research Group, offers these tips for deciding which cloud computing options to consider:

Disaster recovery. Consider storing certain datasets or applications in the cloud for recovery purposes. If you can upload data to the cloud and then restore it using the same provider, it may prove to be a less expensive alternative than building a second data center.

IaaS vs. SaaS. Data centers shouldn’t limit themselves to IaaS-based cloud environments. If you can find a software-as-a-service offering that fits your needs, then you won’t have to worry about investing in more internal or external infrastructure resources.

Colocation and hosting. Most data centers will have a mix of data and applications that may or may not be a fit for the cloud, but remember that it doesn’t have to be all or nothing. To start with, you can try offloading some applications to a colocation or hosting provider with similar infrastructure.

A Better Way To Monitor The Data Center Environment

Create A Comprehensive System That Best Matches Your Facility & Its Needs

DATA CENTER MANAGERS know the importance of an ideal data center environmental monitoring system, but many simply lack the time and resources to find and implement one. Thus, they take a reactionary, piecemeal approach to monitoring, implementing individual components only after an event occurs rather than putting together a unified system at the outset. But there are ways to address such scenarios to get a broader view of environmental conditions.

Get Up To Speed

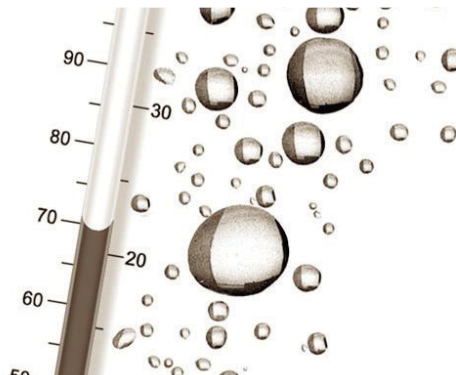
Environmental sensors continue to improve, says Bob Douglass, vice president of sales and marketing at Sensaphone (877/373-2700; www.sensaphone.com). Years ago, sensors were hardwired with inconvenient screw terminals. Today, there are simple plug-in options, he says, with wireless sensors offering more convenience and portability.

Most monitoring systems are scalable and will work for any size of organization, Douglass

says. If you're considering purchasing new monitoring options, be sure to account for your company's needs, he says.

Marc Cram, director of OEM and global accounts at Server Technology (800/835-1515; www.servertech.com), says the ubiquity of temperature and humidity monitoring and water-leak and dry-contact closure sensing makes tracking every data point cost-effective for most data centers. In addition, advanced analytics help managers determine how compute loads lead to hot equipment and where additional cooling may be required.

Calvin Nicholson, Server Technology senior director of software and firmware development, says there are many methods for enabling environmental monitoring, but managers should note advances in how information is being used. "Increased efficiency and reducing costs is critical today as power costs go up and power availability goes down," he says. Operating data centers at



higher temperatures is one way to accomplish this, he says; ASHRAE and The Green Grid can provide some guidance.

Michael Sigourney, president and CEO of AVTECH (888/220-6700; www.avtech.com), says current technical shifts include using more temperature sensors; broader acceptance of flood monitoring; a move toward PoE; monitoring multiple temperature thresholds per sensor; and "most important, a greater utilization of software with automated responses, logging of data, graphing, and advanced reporting."

With PoE, users can easily move monitors and avoid adding power access, he says, while relays are popular because of the more powerful software capabilities enabling users to react to issues. "Automatically turning on a sump pump to remove water when a pipe breaks and your staff is 30 minutes away could mean survival of a business," he says. Custom software interfaces,

Key Points

- Many enterprises are considering modular or scalable environmental monitoring solutions.
- One key to a good monitoring tool is ensuring there is a software element with automation capabilities.
- The monitoring capabilities in many existing DCIM solutions can span IT and physical infrastructure systems.

meanwhile, let teams split responsibility and obtain just what they need and how they want it, Sigourney says.

The Ideal Approach

To create an ideal monitoring program, Douglass says to know the available choices and realistically identify goals and vulnerabilities. For example, is the priority to gain environmental efficiencies to make cost-saving improvements or ensure all systems are operating and

Get Started

Small to midsized enterprises often must balance the demands of a low-cost, high-performance IT infrastructure against a lack of resources to find an optimal IT/environmental monitoring solution, says Marc Cram, director of OEM and global accounts at Server Technology (800/835-1515; www.servertech.com).

Modular or scalable solutions can be an ideal option.

receiving immediate notification upon threats (temperatures, humidity, power, water leaks, smoke, fire, security)? Common-sense evaluations should help identify the best solution, he says.

Server Technology's Cram says the added cost of a few environmental sensors seems minor when you consider one rack of equipment can range from \$50,000 to millions, not to mention the value of what it's computing/serving. "It just makes good sense to monitor the rack, if not every piece of gear in that rack," he says.

Sigourney says that, because facilities are different, solutions should be unique. "No 'one-size-fits-all' approach ever works for environmental monitoring." After implementing a solution, he says, it's important to make adjustments as needed, which is something new users might overlook believing "they have it covered—then something happens." Sigourney points to "EM Hierarchy"—a focus on temperature, power, and humidity in that order—as tending "to effect almost every facility." Monitoring flood/water, airflow, smoke, and room entry are other primary concern areas.

For small to midsized enterprises seeking to create a comprehensive system, Cram says to follow standards. "SNMP over Ethernet is used for communicating with much of the IT infrastructure," he says. BACNET or

building management systems, he says, typically offer a way of "converting to a data structure compatible with information collection and reporting over Ethernet." Many of today's DCIM systems can also span IT and the physical infrastructure.


Sigourney says technology advancements lead some companies to consider replacing monitors every few years. Sensors can typically be used from one model to another and outlive monitors, he says. Sigourney says updating software is the "most important long-term investment necessary and No. 1 failure point." Some users assume monitors are so reliable updates aren't necessary, which is a "huge mistake," he says.

Go Remote

Automation is key to enabling remote management and responding to alerts. Such features typically come via software integrated within hardware monitors or running on the network/cloud, Sigourney says. Some software can monitor unlimited hardware monitors situated globally and support running commands and scripts, shutting down/restarting servers, control relays, phone calls, and more, he says. Device management software allows you to control monitors remotely and turns average users into power users, he says.

Douglass says although standards provide convenience, redundancy provides reliability.

You need both, he says. As long as a monitoring solution is SNMP-compatible, you can include the environmental monitoring with existing infrastructure

monitoring software, he says. For the best of both worlds, a solution supporting redundant out-of-band communication adds extra reliability, he says. 

Action Plan

Act. Don't wait for a problem to occur before considering an environmental monitoring solution.

Judge. Realistically evaluate your facility's age, condition, location, and susceptibility to environmental damage.

Reuse. Check if existing tools (intelligent PDUs, BMS, and DCIM) provide environmental monitoring capabilities.

Post-install. After installing an environmental monitoring system, test it every one to three months.

Adjust. IT facilities tend to be in constant state of flux, so you'll likely need to make adjustments for what you're monitoring.

Standardize. Look to standards from such organizations as LEED and ASHRAE for guidance in setting temperatures and other conditions.

Top Tips

Prioritize. A common mistake is not making environmental monitoring a priority until something bad happens. Instead, research, follow standards, and seek redundancy and reliability.

Test. After purchasing a solution, test it every 30 to 90 days and review its effectiveness multiple times a year.

Use. Ensure physical monitoring systems have a software element. Whether designed to monitor only power and environmental data or part of a full DCIM suite, ensure the tool can issue measurement-based alerts and alarms.

BUYING TIPS:

Equipment Recycling & Disposal Services



THERE'S SO MUCH TO DEAL with when it comes to old equipment. Can you reuse or repurpose it? Or do you need to just get rid of it? If that's the case, a vendor can help you ensure equipment is handled in an environmentally responsible manner while abiding by privacy and compliancy regulations. Here's what to look for.

Recycle vs. Resale

One of the first decisions to make is whether you want to recycle or resell equipment. "If the client has rooms full of retired IT, there are two strategies to consider: recycle or resell. If it's junk from 1985, it would be a waste of time to pursue reselling the product. If its decent stuff from 2004, it's probably still worth thousands of dollars that could return capital to the budget," says Kyle Bittner, business development manager for Exit Technologies (239/596-2254; www.exittechnologies.com).

Recyclers, he says, focus on precious metals and waste material. IT asset managers focus on value and will often give you the best price for your equipment.

Know Your Equipment & Needs

Be sure you understand your equipment and the capabilities of the recycling company.

"Can your equipment be recycled whole, or must it or parts of it be destroyed? How are you going to handle hard drives or

other media devices? Are you going to remove them yourselves and destroy them prior to recycling, or is the service qualified to destroy them for you?," says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com). Be sure any servers have all your data removed, he says, and consider pulling and destroying the data drives prior to recycling.

Check Facilities, Processes

Don't just look for the least expensive company, Koty says. He recommends visiting the firm and inspecting its procedures. Check what security and surveillance the vendor uses, how it can assist with ROI for current projects, and what documentation processes it uses.

Bittner says to find out how the hard drives and sensitive data will be handled. "It's important the product is responsibly handled, otherwise it can result in bad publicity for the company," he says.

Onsite vs. Offsite

With data destruction, you have two choices: onsite or offsite. With an onsite service, you won't have to deal with chain of custody. If your data center stores sensitive data and wants to physically destroy it, you'll have peace of mind from watching the destruction.

If you want absolute destruction, consider offsite data

destruction as service providers typically have more powerful shredders at their facilities than mobile shredder services can offer, plus some offsite data destruction services also double as a reprocessing center that can remarket the parts, providing return value.

What About Liquidation?

One alternative disposal process is liquidation, and, more specifically, choosing a credible vendor with a proven track record to manage a private auction marketplace. Typically this is a third party service provider that handles vetting buyers, reselling equipment, and streamlining monetary returns.

According to Howard Rosenberg, CEO at B-Stock Solutions (866/993-6757; www.bstockolutions.com), "liquidation leads to a couple great outcomes: one, reuse, which is the ultimate in sustainability and, two, revenue, which is something any business appreciates."

Rosenberg says manufacturers should consider liquidation if they have a meaningful quantity of distressed inventory; if they currently liquidate this excess by traditional means (or have never liquidated at all); if they care about protecting their brand by carefully managing the distribution of distress goods; or if they care about profitability. **P**

CHECKLIST

Do your homework. Compile a list of equipment you no longer need, then determine its resale value, who might purchase the equipment, and how the resale value can help fund purchases.

Check for qualifications. Determine how long the prospective vendor has been in business, what its reputation is in the industry, and what compliancy and certification measures it operates by and has achieved.

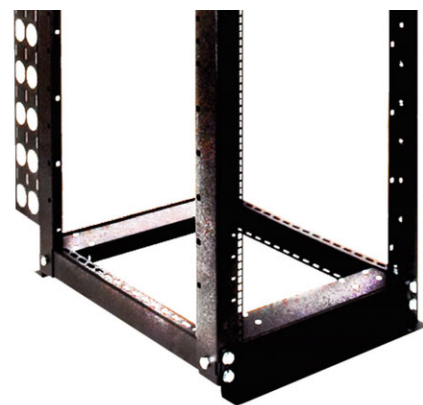
Know the difference between a broker or provider.

Determine if the vendor actually provides recycling and disposal services or is just a broker of such services.

Understand the process. Know how the vendor processes equipment, including who handles equipment, where it goes, how long processing takes, and what documentation you can expect.

BUYING TIPS:

Data Center Racks & Cabinets



RACKS AND CABINETS hold and protect every piece of equipment that runs your data center, so don't rush the decision about which cabinet to purchase. Instead, focus on the most important features and ensure the cabinet will fulfill your needs for years to come.

Know What's On The Market

Start by researching what's on the market. There are full-sized, midsized, and smaller cabinets as well as racks with heights of 30 to 84 inches and widths of 24 to 36 inches.

Rodger Baldwin, executive account manager at Rack Solutions (888/903-7225; www.racksolutions.com), says to consider the height, depth, and width of the cabinet before making a purchase. He says more companies are asking for wider, deeper cabinets. "We have clients asking for 30 inches wide and 48 inches deep," he says, so they can accommodate larger servers, extra cable management space, and better airflow for the equipment mounted in the cabinet.

Eli E. Hertz, CEO and president of Hergo (888/222-7270; www.hergo.com), says to look for potential add-on items, such as overhead storage compartments, power and cable management solutions, and back and side panels. Different sized racks and cabinets paired with additional solutions can

help you design a product that's perfect for your data center.

Pinpoint Special Needs

Although standard racks and cabinets will serve most data center needs, Gina Dickson, director of infrastructure products at Black Box (877/877-2269; www.blackbox.com), says there are four common scenarios where you'll want a specialty rack or cabinet: environmental conditions, noise, space considerations, and cooling.

Dickson says other cabinet types include wallmount versions designed to help save floor space or cost and sound-dampening cabinets for use in areas where people are present or working. You should also consider a rack or cabinet with built-in security measures, such as locked cages or other alternatives, if there is a lot of traffic in your data center.

Get The Right Fit

In most cases, you've decided which pieces of equipment to buy for your data center before you start shopping for the racks and cabinets to store them. It's a great opportunity to measure each piece and create a mock configuration for how it will fit into the rack or cabinet.

But be careful you don't populate the racks or cabinets with more equipment than you can reasonably concentrate in one area in your data center,

says Ken Koty, sales engineer at PDU Cables (866/631-4238; www.pducables.com).

A higher density of equipment creates more heat and possible hot spots. "Make sure your cooling equipment can adequately cool the equipment before you put it all in one spot."

The amount of space the rack or cabinet takes up is equally important. Leave adequate space for future expansion. If you don't, you could get stuck with a cramped and inefficient data center with no room for evolution.

Check For Airflow


If you are utilizing raised floors and CRAC units, having vents or grills to allow airflow through the structure is essential, Koty says. "Look for server cabinets that provide good ventilation. Make sure that the cabinets

draw cold air from the front and discharge in the back to enable a hot/cold-aisle configuration."

Baldwin agrees, adding, "whether or not you are using hot/cold aisles, the cabinets should always meet or exceed the [airflow] requirements of the equipment being installed."

Research The Vendor

The decision of whom to buy from is essential. "You need to make sure that the supplier you have chosen has been in business long enough to have an established reputation in the market," Hertz says.

Knowledge of the product is key. Hertz says you should be able to grill the supplier on what you are actually going to be getting, and the vendor should know the product from nuts to bolts. 

CHECKLIST

Cable management. Is cable management built-in, or does the rack or cabinet leave adequate space to neatly route cables?

Mounting. Does the rack/cabinet provide PDU mounting options such as brackets?

Special requirements. Does the equipment you're mounting require tapped or M6 holes?

Check for fit. Will you need to disassemble the rack/cabinet to get it in the room?

Security. Can the cabinet be locked to prevent potential security issues?

BUYING TIPS:

DCIM Solutions

WHEN IT COMES TO data center infrastructure management solutions, benefits include the ability to obtain a big-picture view of energy usage, run “what-if” scenarios to plan for additions or changes, and help bridging the gap between IT and facilities.

But those benefits don’t come without potential pitfalls when trying to choose among the relatively vast number of DCIM tools available. Here are some features to look for.

Bridge The Gap

IT and facilities integration, or the ability to provide information that’s helpful to both the IT and facilities groups, is a key element to look for in a DCIM solution, says Jay Pultz, vice president and distinguished analyst at Gartner.

Clive Longbottom, service director at Quocirca, says DCIM systems started off as far more of a tool for the facilities team as part of a building information modeling (BIM) tool that would map out and place major equipment in a schematic of the facility.

“It soon became apparent that allowing the IT equipment to be placed directly in the schematic was useful for both IT and FM,” Longbottom says. This brought DCIM systems into competition with the asset discovery and management systems IT teams typically relied on, he says.

Although the two systems can’t always interoperate, he says, a common database such as CMDB can help to “provide a single true view of what is in a data center.” Longbottom says it is these insights that can help CIOs better advise the business.

Because DCIM tools can provide valuable information to both facilities and IT, Pultz says you need a solid understanding of your prioritized needs before investing in a tool. Consider factors such as functions, platforms, support, who will use the product, customization features, costs, and the vendor’s road map.

Create What-If Scenarios

A DCIM tool should let you easily create what-if scenarios to visualize and better understand how moving or adding equipment or making other changes will impact the data center. Pultz says such capabilities can help you defer spending as you optimize power, cooling, and physical space, while also realize cost savings via better energy management.

“For example,” Longbottom says, “would placing this server in this rack here cause an overload on this power distribution block? Would placing these power transformers here cause a hot spot that could not be cooled through existing systems?” Such capabilities help both facilities and IT work



together to ensure that the data center is optimally designed and gives the best support to the business, he says.


The 3D visual representations and granular system details available through most DCIM tools, along with real-time data from environmental sensors, lets you quickly see what will happen to cooling and airflow as systems are changed and new equipment is added, Longbottom says.

Make Sure It Will Work

Finding a DCIM tool that is a good match for your data center is key, Pultz says. For starters, make sure it matches in terms of size, vendors, existing tools, and available data.

When choosing a vendor, make sure to check credentials

and references and look for product maturity, Pultz says. Longbottom says that vendors of UPSes and other facilities equipment, along with smaller new-to-market vendors, have been among the leaders in developing full-service DCIM tools.

Is DCIM for you? “If you are looking at change within your data center by growing or shrinking the amount of IT equipment in it to an appreciable level, then DCIM should be in place,” Longbottom says. But if you have recently made significant changes; predict that the data center will stay the same for a while; or already have full asset management, systems management, and BIM tooling in place, DCIM may not be for you right now. 

CHECKLIST

Jay Pultz, vice president and distinguished analyst at Gartner, offers this list of tips for purchasing a DCIM solution:

Know your needs. What are you hoping to accomplish with the tool?

Conduct a proof of concept. Check to make sure the tool can actually do what you want it to.

Check vendor references. Make sure the vendor is reputable and offers a mature product.

Don’t underestimate install time. Pultz says clients often report that, despite improvements in automation and auto-discovery, it can still take months for DCIM to be operational.

BUYING TIPS:

Colocation Services

SO YOU'VE DECIDED to look into data center colocation. The first step in selecting a provider is to determine what your true costs are so you can make an apples-to-apples comparison of services, says J. Bruce Daley, vice president and principal analyst at Constellation Research.

"This is usually a different process than budgeting, since the cost has to be calculated according to the vendor's or industries' pricing regime," he says. To ensure that you choose the most cost-effective colocation provider the first time around, read on for detailed advice.

Examine All The Options

Faisal Ghaus, vice president of TechNavio Research, says you can categorize colocation service vendors into three major segments: planning and consultation, facilities infrastructure provisioning, and maintenance and monitoring.

Vendors that offer planning and consultation options "provide enterprises with the required support for effective implementation and selection of colocation services," he says.

If you're looking for hardware infrastructure support, go with a colocation provider that provisions data center space; computing equipment

installation and maintenance; and support services for both the enterprise and end users, Ghaus says.

Within the maintenance and monitoring segment, look for vendors that offer expertise in efficient facility management and optimization.

Choosing one of these three paths shouldn't pigeon-hole you into receiving only those services because there are a number of vendors that provide one or more of these services for the enterprise, Ghaus says.

What's The Impact Of The Physical Location?

Because there is an increasing demand for continuous monitoring, the geographical location of the facility and its cooling capabilities should both be important factors in your decision-making process.

"Once you get past latency issues, the most important factor to consider is how cool is the climate the data center is located in and how close is it to renewable energy resources," Daley says. "This is one of the reasons I like data centers in Iceland."

Reputation Is Everything

Aside from assuring that you've selected a safe service provider location, you also want to get the lowdown on the provider's reputation.

Ghaus says to take into account a service provider's years of experience and current clientele to avoid compromising and get what you need.

Know You What You Can & Can't Do With SLAs

Service-level agreements were originally created to protect the vendor and not the customer, Daley says, so keep this in mind when you're discussing policy and annual service reviews.

"Apart from the standard services," Ghaus says, "the enterprise is advised to have a plan of all the services that will be procured from the colocation service providers over the lifetime of the service."

He adds that all the enterprise requirements need to be included as a part of the SLA "and also provision has to be made to incorporate the required features in the future if necessary."

The key advice to remember is that if you're the customer, you have the opportunity to utilize some negotiating power. Be sure to look at all reference documents and define terms that seem contextually vague.

Consider "test calling" the service provider prior to meeting—during both normal support hours and after hours—and simulating an incident to evaluate the escalation process. **P**

CHECKLIST

Consider the following list of questions—based on suggestions from TechNavio Research Vice President Faisal Ghaus—when meeting with a potential colocation provider:

- Does the service provider value and regularly evaluate data security?
- What is the provider's reputation and experience?
- To what extent can the provider customize its services?
- Where is the facility located? Is it a safe place for long-term data storage?
- Do you feel comfortable about the pricing options?
- Does the vendor provide platform-independent solutions?



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APRIL

2014 High Performance Computing Linux for Wall Street

April 7
Roosevelt Hotel
New York, N.Y.
www.flaggmgmt.com/linux

AITP Wheeling

April 9
White Palace at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

AITP Research Triangle Park

April 10
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

AITP Washington D.C.

April 10
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

Women In Cybersecurity

April 11-12
Nashville Airport Marriott
600 Marriott Drive
Nashville, Tenn.
www.wicys.net

Configuring, Managing & Troubleshooting Exchange Server 2010

April 14
New Horizons Washington, D.C.
1331 F St. N.W.
Suite 420
Washington, D.C.
www.dcnewhorizons.com

AITP Lehigh Valley - Annual Tour

April 16
www.lv-aitp.org/events.php

AITP Twin City

April 17, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

CompTIA Security+ Certification

April 21
New Horizons Charlotte
9140 Arrowpoint Blvd.
Suite 400
Charlotte, N.C.
www.nhcharlotte.com

AITP Long Island - Healthcare SIG

April 22
8 a.m.
www.aitp-li.org/?q=node/30

SharePoint TechCon

April 22-25
Hilton San Francisco Union Square
333 O'Farrell St.
San Francisco, Calif.
www.sptechcon.com

Data Center World— Global Conference

April 28-May 2
The Mirage
Las Vegas, Nev.
www.datacenterworld.com/spring

AITP Akron

April 29
Akron, Ohio
www.akron-aitp.org

MAY

**AITP
Research Triangle Park**

May 8
NC State University Club
4200 Hillsborough St.
Raleigh, N.C.
www.rtp-aitp.org

AITP Washington D.C.

May 8
Alfio's La Trattorio Restaurant
4515 Willard Ave.
Chevy Chase, Md.
www.aitpdc.org

Microsoft SharePoint 2010

May 12
New Horizons Greensboro
7019 Albert Pick Road, Suite B
Greensboro, N.C.
www.nhgreensboro.com

**AITP
Wheeling**

May 14
White Palace
at Wheeling Park
1801 National Road
Wheeling, W.Va.
www.aitp-wheeling.org

**AITP
Twin City**

May 15, 7 p.m.
Ozark House Restaurant
704 McGregor St.
Bloomington, Ill.
www.aitp.org/members/group_content_view.asp?group=75779&id=125369

**AITP
Akron**

May 20
Akron, Ohio
www.akron-aitp.org

**AITP Long Island -
CIO Panel**

May 20
11 a.m.
www.aitp-li.org/?q=node/31

**AITP
Lehigh Valley -
BYOD: The Illusion
Of Cost Savings**

May 21
The Starlight Diner
233 N. Route 100
Allentown, Pa.
www.lv-aitp.org/events.php

**AnDevCon
Spring**

May 27-30
Sheraton Boston Hotel
39 Dalton St.
Boston, Mass.
www.andevcon.com

JUNE

**CompTIA
Security+Certification**

June 2
New Horizons Charlotte
9140 Arrowpoint Blvd.
Suite 400
Charlotte, N.C.
www.nhcharlotte.com

**Do you have an event you'd like to see listed?
Send an email to feedback@processor.com.**



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PROCESSOR.

PROCESSOR[®]

Solutions Directory

Here are brief snapshots of several companies offering products designed for the data center and IT industry. Listings are sorted by category, making it easy for you to find and compare companies offering the products and services you need.

You can find more detailed information on these companies and the products they offer inside this issue.

**To list your company and products,
call (800) 247-4880.**

PHYSICAL INFRASTRUCTURE



ITWatchDogs

ITWatchDogs manufactures environmental monitors that help prevent downtime from climate- and power-related issues. Its Web-enabled monitors let users keep an eye on remote conditions from a secure Web interface and receive SNMP, email, SMS, and voice call alerts when specified alarm thresholds are exceeded for external factors, including temperature, humidity, airflow, power failure, smoke, water detection, and more.

Products Sold:

- Climate monitors
- Power monitors
- Digital and analog sensors
- IP surveillance cameras

(512) 257-1462 | sales@itwatchdogs.com | www.itwatchdogs.com

PHYSICAL INFRASTRUCTURE

PANDUIT[®]

Customers look to Panduit as a trusted advisor who works with them to address their most critical business challenges within their Data Center, Enterprise, and Industrial environments. Panduit's proven reputation for quality and technology leadership coupled with a robust ecosystem of partners across the world enables Panduit to deliver comprehensive solutions that unify the physical infrastructure.

Products Sold:

- Abrasion Protection & Heat Shrink
- Cable Ties & Accessories
- Cabinets, Racks & Cable Mgmt
- Copper & Fiber Systems
- Identification
- Intelligent Systems
- Outlets & Faceplates
- Power & Environmental Monitoring
- Routing & Pathways
- Safety & Security
- Supports and Fasteners
- Terminals, Power Connectors & Grounding
- Tools
- Wiring Duct

(800) 777-3300 | www.panduit.com

PHYSICAL INFRASTRUCTURE



BLACK BOX[®]

NETWORK SERVICES

Black Box is a leading technology product solutions provider that helps customers build, manage, optimize, and secure their networks. The company is a single source for cabling, cabinets and racks, localized cooling, power and surge protection, environmental monitoring, and more. Black Box also offers a best-price guarantee and FREE, live, 24/7 U.S.-based Tech Support.

Products Sold:

- Acoustic IT Enclosures
- Cabinets & Racks
- Cables & Patch Panels
- Console Servers
- Cooling
- Datacom
- Industrial
- Infrastructure Hardware
- KVM
- Networking
- Power
- Remote Monitoring

(877) 877-2269 | www.blackbox.com

PHYSICAL INFRASTRUCTURE



HM CRAGG

Quality People. Quality Power.

As an integrator and master distributor providing quality power solutions, HM Cragg has built a reputation as the company that delivers innovation to aid and satisfy its customers. HM Cragg was founded in 1968 and is 100% employee-owned, focusing on quality people and exceptional products.

Products Sold:

- AC and DC power solutions (UPSes, power distribution)
- Control and monitoring (environmental and power)
- Connectors and cables (cord sets, ePDU cables)
- Cooling and Racks (airflow management, portable cooling)

(800) 672-7244 | www.hmcragg.com

PHYSICAL INFRASTRUCTURE



CHATSWORTH PRODUCTS

Chatsworth Products (CPI) is a global manufacturer providing voice, data products, and service solutions that optimize, store, and secure technology equipment. We offer innovation, configurability, quality, and value with a breadth of integrated system components, covering virtually all physical layer needs. Unequalled customer service, technical support, and industry-leading distributors, assures customers that CPI is dedicated to delivering products and services designed to meet their needs.

Products Sold:

- Cabinet, Containment & Enclosure Systems
- Thermal Management
- Wall-Mount Systems
- Cable Management
- Power Management
- KVM Systems
- Environmental Monitoring & Security
- Seismic Protection Systems
- Cable Runaway and Tray

(800) 834-4969 | www.chatsworth.com

PHYSICAL INFRASTRUCTURE



Sensaphone has been designing and manufacturing remote monitoring systems for more than 25 years and has more than 300,000 of its products in use. Sensaphone's product lineup offers a full range of devices with a broad number of features and applications designed to monitor your entire infrastructure and alert you to changes. All product engineering functions, including hardware and software design and circuit board layout and assembly, are performed at the Sensaphone facility in Aston, Pa.

Products Sold:

Remote monitoring solutions that provide email and voice alarm notification for problems related to temperature, humidity, water detection, power failure, and more.

(877) 373-2700 | www.sensaphone.com

PHYSICAL INFRASTRUCTURE



Server Technology is committed to the PDU market with the largest group of engineers dedicated to power distribution and other solutions within the equipment cabinet. Advancements in device power monitoring help data centers monitor and improve their efficiency, and continuous research and development is fueled by companies that look to Server Technology for their custom cabinet power solutions.

Products Sold:

A complete line of cabinet PDUs, including Per Outlet Power Sensing (POPS), Rack Mount Fail-Safe Transfer Switch, Console Port access with remote power management, Switched, Smart, Metered, Basic, and -48 VDC

(800) 835-1515 | www.servertech.com

PHYSICAL INFRASTRUCTURE



BayTech was founded in 1976 and, since the 1990s, has developed unique products for remote power management. The company uses printed circuit board instead of wires for a better, more resilient connection between the data center equipment and the receptacle. BayTech provides an extensive Web site with brochure downloads, warranty information, and reseller support and also offers evaluation units for data centers.

Products Sold:

- Power control, distribution, management, and metering
- Power transfer switches
- Console management and remote site management

(800) 523-2702 | www.baytech.net

PHYSICAL INFRASTRUCTURE



RackSolutions has been serving the data center market for more than 10 years. All of our products are designed, engineered, built, and shipped under our own roof. We have product solutions available for every major OEM, but if one of our existing products doesn't fit your needs, our top-notch mechanical and electrical engineers can create the item you need from scratch, solving even the toughest installation design challenges. Best of all, we typically don't charge up-front fees for design services.

Products Sold:

- Computer Server Racks
- Cabinets and Shelves
- Mounting Products

(888) 903-7225 | www.racksolutions.com

PHYSICAL INFRASTRUCTURE



Atlas has specialized in portable air conditioning since 1979 and leads the industry in server room and data center portable cooling. We offer "24/7" response from company-owned, full-service offices around the country, each stocked with a wide inventory of equipment for primary, supplemental, or emergency cooling. All portable items are available for sale or rental. Atlas is a Preferred MovinCool® Distributor and a GSA Certified MAS Contractor.

Products Sold:

- 1-5 ton portable air conditioners, air and water-cooled
- 12-ton portable coolers designed to roll through a standard doorway
- Ceiling-mount air conditioners – full line of MovinCool® packaged a/c units

(800) 972-6600 | www.AtlasSales.com

PHYSICAL INFRASTRUCTURE



Since 1979, Simplex Isolation Systems has been setting new design standards in modular expandable cleanroom components, isolation curtains, hardware, and new product development. Fontana, Calif.,-based Simplex's unique strip doors and mounting systems are designed for quick installation. Simplex parts and materials perform with optimum efficiency, last longer, and save you money. And with Simplex, you are always backed by industry expertise, product knowledge, and the best warranties in the market.

Products Sold:

- Cleanrooms
- Strip doors
- Enclosures
- Curtains

(877) 746-7540 | www.simplexisolationssystem.com

PHYSICAL INFRASTRUCTURE



Upsite Technologies®, Inc. is the industry leader in data center airflow management and provides a full suite of products and services designed to optimize data center cooling systems, allowing managers to maximize cooling capacity while reducing energy costs. Upsite distributes its award-winning line of services and products, including its KoldLok® raised-floor grommet, through leading channel partners in the data center industry throughout the United States, EMEA and the Asia Pacific region.

Products Sold:

- HotLok
- AisleLok
- KoldLok
- EnergyLok

(505) 798-0200 or (888) 982-7800 | www.upsite.com

PHYSICAL INFRASTRUCTURE



Total Cable Solutions (TCS) provides a wide range of products from copper keystone jacks to custom bundled fiber cables. All products are manufactured with TCS' highest quality, in factories that are ISO-9001 and TUV Certified. All of our cable lines meet or exceed EIA/TIA RoHs standards.

Products Sold:

- Fiber patch cords
- Pre-terminated multi-fiber trunk cables
- CAT5e and CAT6 patch cables
- Fiber and copper patch panels

(888) 235-2097 | www.TotalCableSolutions.com

PHYSICAL INFRASTRUCTURE



Based in New York City, Hergo Ergonomic Support Systems is an independent designer and manufacturer of enclosure cabinet solutions, technical computer furniture, and modular racking systems. The company's products are designed to promote organization in the workspace and to increase the productivity of computers, peripherals, and communications equipment. Hergo is known for its high-quality products and superior customer service.

Products Sold:

- Racks
- Computer desks
- Enclosures/cabinets
- Cable management
- Motorized workstations
- Power management
- Flat-panel arms

(888) 222-7270 | www.hergo.com

PHYSICAL INFRASTRUCTURE



PDU Cables is the leading supplier of power distribution cables assemblies to data centers in North America. PDU Cables has been serving this industry since 1981 and is the first independent cable assembly company to introduce colored conduit into the power distribution cable market, the first to get UL 478 listing, and the first to introduce the Power Cable and Equipment Configurator software tool. The company is centrally located in Minneapolis, Minn., allowing it to offer 24-hour turnaround and shipping time of just one or two days to almost any United States destination.

Products Sold:

A range of power cables, cable seals, and power cord assemblies.

(866) 631-4238 | www.pducables.com

PHYSICAL INFRASTRUCTURE



Founded in 1995, Austin Hughes Electronics Ltd. is a design and manufacturing group that offers a broad range of solutions based around 19-inch rack-mount technology. With a wealth of experience, Austin Hughes design and development teams are focused to rapidly transform customer requirements and market trends into saleable solutions.

Products Sold:

- Infra solution Cabinet Smartcard Handles
- InfraPower Cabinet Intelligent PDUs
- CyberView Rackmount KVM & LCD Console Drawer
- Environmental Sensors

(510) 794-2888 | www.Austin-Hughes.com

PHYSICAL INFRASTRUCTURE



AVTECH, founded in 1988, manufactures hardware and software for users at all skill levels to easily monitor environmental conditions in IT and other facilities. Their products will monitor, alert, log, graph, view, respond, report, and protect. Over 130,000 customers across 178 countries makes AVTECH a proven market leader, allowing 'Disaster Prevention' instead of 'Disaster Recovery'.

Products Sold:

A full range of environment monitors, sensors and software for temperature, humidity, heat index, power, flood/water, smoke/fire, air flow, room entry, outdoor and fluid temperature, fuel and water tank levels, panic buttons, oil, sound, light, and more.

(888) 220-6700 | www.AVTECH.com

PHYSICAL INFRASTRUCTURE



LINDY USA specializes in cables, adapters, electronics, and accessories for computer, networking, and audio video applications. Since 1932, Lindy has supplied high-quality interconnects to customers in commercial, telecom, and residential markets. What sets us apart is our complete dedication to innovation, performance, and reliability. Our cabling products are truly outstanding.

Products Sold:

- Networking Products
- Audio / Video
- KVM
- Sharing, Converting, Extending
- USB and FireWire
- Input Devices
- Hardware and Security
- Add-On Cards
- Power
- Cables
- Adapters
- Much more!

(888) 865-4639 | www.lindy-usa.com

MESSAGING & TELEPHONY



3CX was founded in 2005 by entrepreneur Nick Galea who saw the need for an open standard software PBX for Microsoft Windows. With 86.7% of businesses using Windows as their operating system, the need for a software-based phone system which runs on Microsoft Windows was evident. 3CX maintains a global presence with offices around the world, including the United States, the UK, Germany, France, Japan, and Cyprus, as well as fully localized websites available in more than eight languages. 3CX has been selected by leading companies and organizations worldwide to meet their unified communications and telephony requirements, including Boeing, Pepsi, Harley Davidson, Hugo Boss, American Express, and Toshiba.

Products Sold:

- Full range of VoIP telephony software products

(404) 465-3660 | www.3CX.com

SERVERS



Supermicro® (NASDAQ: SMCI), the leading innovator in high-performance, high-efficiency server technology, is a premier provider of advanced server Building Block Solutions® for enterprise IT, data center, cloud computing, HPC, and embedded systems worldwide. Supermicro is committed to protecting the environment through its "We Keep IT Green®" initiative by providing customers with the most energy-efficient, environmentally-friendly solutions available on the market.

Products Sold:

- Servers
- Network switches
- GPU servers
- Motherboards
- Storage solutions
- Embedded
- Chassis
- Blade servers

(408) 503-8000 | www.supermicro.com

SERVERS



Chenbro is a leader in enclosure solutions, selling its products primarily to system integrators and OEM and channel partners. The company's extensive research and development efforts help it to keep its competitive edge and maintain market leadership, with special focus on thermal, EMI, and acoustic solutions. Taiwan-based Chenbro has offices in the United States, UK, The Netherlands, and China.

Products Sold:

- A comprehensive line of PC chassis, server/workstation chassis, rackmount chassis, and HDD enclosures.

(909) 947-3200 | www.chenbro.com

CLIENTS



DoubleSight is a leading manufacturer of multiple monitor solutions, portable monitors, large monitor displays, digital signage, and monitor mounting solutions.

Products Sold:

- Dual Monitors
- Flex Arm Accessories
- Multi Monitor Flex Stands
- Single Monitors
- Single Monitor Flex Arms
- Smart USB Monitors
- Multi Monitor Flex Arms
- Accessories/Power Supplies
- Flex Stand Accessories
- Refurbished Models

(877) 896-5237 | www.doublesight.com

CLIENTS



Dynatron excels in manufacturing CPU coolers as well as AC and DC fans from 25mm to 200mm. They also provide for OEM customers any custom-design thermal solution products. Their branded thermal solutions are widely recognized and integrated into desktop PCs, servers, workstations, notebooks, gaming machines, and storage systems. In 2001, Dynatron won its reputation as the first company to integrate the state of the art MicroFin Technology into a PC heat sink.

Products Sold:

- Active coolers
- Blowers
- Passive heat sinks
- Cross flow blowers
- Heat pipes
- Water coolers

(510) 498-8888 | www.dynatron-corp.com

EQUIPMENT DEALER



In 1987, Pegasus Computer Marketing started providing mainframe products to the end-user market. What began as a sales-only organization soon adapted to offer in-house repair and refurbishment. During the past 10 years, Pegasus has focused primarily on the point-of-sale and barcode industries, buying, selling, and providing service contracts for anywhere from a few scanners to hundreds.

Products Sold:

We buy, sell, and service:

- Point-Of-Sale Equipment and POS/PC Flat Panels
- Wired and Wireless Barcode Hardware
- Kronos Time Clocks and Accessories

(800) 856-2111 | www.pegasuscomputer.net

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Storage Server Chassis

RM43260

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• Dual Domain SAS Controllers
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RM14500

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with HDD Easy-swap Installation

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E-mail: usinfo@chenbro.com



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